Habitat Mitigation Monitoring Plan
for the
Lower Berryessa Creek Program Elements:
Lower Berryessa Creek and Lower Calera Creek

Prepared by

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Section 1.0 Introduction

This Habitat Mitigation and Monitoring Plan (HMMP) has been prepared for the Santa Clara Valley Water District (SCVWD) to assure fulfillment of the habitat Mitigation Monitoring and Reporting Program (MMRP) adopted by the agency's Board of Directors;[1] and, to guide compensatory revegetation, creation, and revegetation activities for the Lower Berryessa Creek and Lower Calera Creek elements of the Lower Berryessa Creek Flood Protection Program. Together, the two program elements are referred to herein as the Project. The HMMP proposes mitigation and monitoring actions to ameliorate project-related impacts to jurisdictional waters and biological resources. Specifically, this HMMP prescribes a range of mitigation activities to offset temporary impacts to a total of:

- 5.21 acres of wetlands;
- 4.17 acres of open water habitat;
- 1.20 acres of upland woody vegetation on inboard levee slopes (being treated as 'riparian' habitat per CDFW instruction);
- 16.83 acres[2] of ruderal annual grassland habitat; and,
- jurisdictional waters regulated by the California Department of Fish and Wildlife, the Regional Water Quality Control Board, and the U.S. Army Corps of Engineers under various state and federal regulations.

The components of this HMMP will be incorporated into the plans and specifications of the Project to assure proper implementation under a separate installation contract.

1.1 LOCATION OF PROJECT ELEMENTS

The Lower Berryessa and Lower Calera Creek projects are located in a developed portion of eastern Santa Clara County within the City of Milpitas, (see **Figure 1**). Berryessa Creek is a part of the Coyote Watershed and is a major tributary of Coyote Creek. The Berryessa Creek watershed, including Lower Calera Creek, has a drainage area of approximately 22 square miles, draining a large area of the City of Milpitas and a portion of the City of San José. Berryessa Creek originates in the Los Buellis Hills of the Diablo Range, between Ed R. Levin County Park and Alum Rock Park, east of the City of San José. It flows westerly to Interstate 680 (I-680), then northward through the City of Milpitas to its confluence with Lower Penitencia Creek.

Lower Berryessa Creek

The Lower Berryessa Creek element extends upstream from the confluence of Lower Penitencia and Berryessa Creeks at the western end of Reach A, approximately 8,700 feet, to the downstream face of the bridge crossing of Calaveras Boulevard at the upstream terminus of Reach G, (see **Figure 2**). This element also includes a short segment (30 lf) of Penitencia Creek and a short segment (75 lf) of Tularcitos Creek, at their confluences with Lower

[1] SCVWD Board Action Certifying the Final Program Environmental Impact Report, Adopting the Mitigation Monitoring and Reporting Program, and Findings of Fact and Statement of Overriding Conditions for the Lower Berryessa Creek Program. Resolution No. 11-78. December 13, 2011.

[2] Prior SCVWD calculations of ruderal annual grassland habitat within the project area incorrectly included areas of existing hardscape; the current acreages correct that mistake. Recent District calculations are also more accurate based upon recent project refinements in design.

Berryessa Creek, where some minor transitional work between old and proposed structures would occur. With the exception of the Milpitas Town Center to the south, this element is surrounded by single-family homes. Lower Berryessa Creek is primarily a managed flood control channel, the majority of which is an earthen channel. Within this element, five bridges cross the creek:

- Abel Street Bridge
- Southern Pacific Railroad / Valley Transportation Authority Light Rail Bridge
- North Milpitas Boulevard Bridge
- City of Milpitas Pedestrian Bridge
- Hillview Drive Bridge

To accommodate the 1% annual probability of occurrence flow event, SCVWD proposes to raise the pedestrian bridge. The other bridges would remain at their existing elevations and headwalls would be added to the North Milpitas Boulevard Bridge to contain the 1% flow without overtopping the creek banks. The Lower Berryessa Creek element is divided into Reaches A through G, with Reach A at the downstream end of the creek section and Reach G at the upstream end.

Lower Calera Creek

The Lower Calera Creek element begins at the confluence of Berryessa Creek and extends upstream approximately 3,000 linear feet to the drop structure behind Milpitas High School, (see **Figure 3**). Calera Creek originates northeast of the City of Milpitas, in the Diablo Range in the northern part of the Ed R. Levin County Park. It flows westward to its confluence with Berryessa Creek and drains a watershed with an area of less than three square miles. Land uses surrounding the Calera Creek elements include single-family homes, schools, open space, and commercial or office parks. The Calera Creek element is divided into Reach A and B, with A at the downstream end. Within the program area, Calera Creek is primarily a managed flood control channel, the majority of which is an earthen, trapezoidal channel. Reach A of Lower Calera Creek is a concrete-lined U-shaped open box culvert. Three bridges cross the affected section of Calera Creek:

- Southern Pacific Railroad (SPRR) / Valley Transportation Authority (VTA) Light Rail Bridge
- North Milpitas Boulevard Bridge
- Arizona Avenue Bridge.

SCVWD proposes to retain these bridges at their existing elevations and add headwalls to each of these bridges to contain the 1% flow without overtopping the creek banks.

1.2 DESCRIPTION OF PROJECT ELEMENTS

The project is designed to increase the flow conveyance capacity of the channel during large flow events. The project would not change the watershed drainage area, flow patterns, or hydrology of the watershed. Less than bank full flows would continue to occur at the same volume and frequencies as before construction, which will provide sufficient water to sustain the restored wetlands and riparian habitat. In particular, tidal influences in Reaches A and B of Lower Berryessa Creek and Reach A of Lower Calera Creek and dry season low flows throughout the project area will be unchanged from before construction.

Lower Berryessa Creek

The improvements along Lower Berryessa Creek will include reconstructing levees and replacing existing levees with floodwalls. Levees along the northeast side of the channel will be reconstructed and raised for the entire length of this element, with the exception of a small segment upstream of the SPRR/VTA Bridge where the existing levee would be replaced with floodwalls. Floodwalls will be constructed on the southwest side of the channel for the entire length of this project element. To improve access for maintenance activities, the project included maintenance roads on either side of the channel. For most of the creek length, the existing maintenance roads will be reduced from the existing 4 roads (i.e. high and low rods on either side of the channel) to 2. The improved channel will have an 18-ft wide low maintenance road surfaced with pre-fabricated cellular concrete mats inboard of the floodwall on the southwest bank of the creek channel. This low maintenance road will have turnouts at intervals to facilitate movement of large equipment. On the northeast bank of the creek, an 18-ft wide maintenance road surfaces with asphalt will be constructed on the crest of the reconstructed levee. This road will also serve as a pedestrian/bicycle trail, replacing an existing trail. Levees and floodwalls at the confluences of Lower Calera and Tularcitos Creeks with Lower Berryessa Creek would be modified to tie into the reconstructed and raised northeast bank levee.

The channel area of Lower Berryessa Creek (top of bank to top of bank) will increase 21.2% from 29.6 ac to 35.9 ac due to the replacement of the west levee with a floodwall. This additional channel area will be devoted to creation of compensatory riparian and wetlands habitat in excess of existing habitat areas, and of greater ecological value than existing. SCVWD will construct three low earthen benches within the Lower Berryessa Creek channel adjacent to the northeast levee, which will help create and maintain the low flow channel within the creek. SCVWD will plant native riparian vegetation on these benches to compensate for removal of existing scattered mostly non-native ornamental trees replace located on the existing levees. In addition, we will actively re-vegetate and create streambed wetlands adjacent to the low flow channel. Wetland habitat will be restored and created in all stream bed areas, except the low flow channel (i.e. open water habitat), the riparian benches, or existing concrete bed lining that will remain after construction. SCVWD will implement adaptive management measures, including salvage of existing plants and seeds, installation of plants/seeds/cuttings, robust monitoring of growth, and secondary planting if needed, to ensure that planted riparian and wetlands areas thrive and achieve long-term sustainability.

Lower Calera Creek

Proposed improvements to Reaches A and B of the Lower Calera Creek element will include constructing concrete floodwalls along each side of the existing channel. The total area of the channel (top of bank to top of bank) in these two reaches will increase by 37% from 3.48 ac to 5.53 ac, due to south bank levee reconstruction and widening along Reach B and construction of flood walls outside the existing U-frame channel in Reach A. The increases in channel area of 2.05 ac will primarily be devoted to a new maintenance path on the north bank in Reach B, and a new maintenance road on the south bank in Reaches A and B. Because these roads and path will be inboard of the flood walls, they are considered within the channel; however these roads and path will be several feet above the channel bed. In Reach A, the south bank maintenance road will be a new feature adjacent to the existing concrete-lined U-frame channel reach that currently lacks any maintenance roads. This road will be located outside of the existing concrete U-frame in Reach A. In Reach B, a new 18-ft wide maintenance road on the south bank and a new 5-ft wide maintenance trail on the north bank will replace existing levee crest roads on both banks, which are outside the channel. The remaining increase in channel area will be dedicated

to creation of wetlands habitat in Reach B, increasing by 110% the area of freshwater/seasonal wetlands in the Lower Calera Creek channel bottom.

Within Reach A, from the confluence with Lower Berryessa Creek to North Milpitas Boulevard, the channel consists of an existing U-frame concrete bed and bank lining. The existing concrete U-frame in Reach A will remain, with the modifications and additions described below:

- On the north side of the channel, construct a new concrete flood wall outboard of the existing channel wall,
- On the south side, lower the existing U-frame wall by removing the uppermost two feet of concrete wall,
- Construct a new elevated 18-ft wide maintenance road surfaced with compacted decomposed granite, outboard of the lowered south bank concrete wall,
- Construct a new low concrete flood wall outboard of the new maintenance road, and
- Add new headwalls to the existing railroad bridge.

It should be noted that the above modifications would all occur outside the existing wetted perimeter of Reach A of Lower Calera Creek. The existing channel bed lining in Reach A would not be excavated or re-graded, but may require temporary dewatering to allow equipment access within the channel during removal of the upper 2 ft of the existing south bank U-frame wall. Dewatering of the channel would not be necessary to construct the new south bank maintenance road or the flood walls on either side of the existing U-frame channel.

Within Reach B, the existing earthen levee on the north bank will be retained, raised slightly and a concrete floodwall ranging in height from 2 to 5 ft constructed on its crest. Inboard of the north bank floodwall, a new 5-ft path will be surfaced with compacted decomposed granite. On the south bank, SCVWD will remove the existing earthen levee and reconstruct it to widen the channel bottom. A concrete floodwall with a height of 3 to 6.5 ft will be built on the reconstructed levee crest. Inboard of that levee, a new 18-ft wide road surfaced with compacted decomposed granite will provide channel access for maintenance purposes. The North Milpitas Boulevard and Arizona Avenue Bridges will be unchanged except for the addition of concrete headwalls to retain high flow within the channel. Other than headwalls, no changes to these existing bridges are proposed.

Lastly, improvements in Lower Calera Creek will include the grading of areas adjacent to the low flow channel to accommodate wetlands creation through installation of plants/seeds/cuttings. Planting will occur the same year as construction, and planted areas will be monitored and additional planting undertaken if revegetation is less than complete.

Lower Berryessa and Lower Calera Creek Creek Flood Protection Improvements Project . 201425

SOURCE: ESA

Figure 1
Project Area

0 1000
Feet

SOURCE: GlobeXplorer; ESA

Lower Berryessa and Lower Calera Creek Creek Flood Protection Improvements Project . 201425

Figure 2

Stream Reaches of the Lower Berryessa Creek Project Element

0 500
Feet

SOURCE: GlobeXplorer; ESA

Lower Berryessa and Lower Calera Creek Creek Flood Protection Improvements Project . 201425

Figure 3

Stream Reaches of the Lower Calera Creek Project Element

Section 2.0 Existing Conditions

The two primary creeks in the project area, Lower Berryessa and Lower Calera, and small sections of Lower Penitencia and Tularcitos Creeks within the project area, are managed earthen flood control channels, with some limited areas of existing structural protection and concrete bed linings. The vegetation / habitat classifications presented herein are based on field observations and on the California Department of Fish and Wildlife (CDFW)[3] List of California Terrestrial Natural Communities recognized by the California Natural Diversity Database (CNDDB).[4] This HMMP relies on A Manual of California Vegetation,[5] which maintains a detailed inventory of terrestrial natural communities based on the dominant plant species present. Wildlife habitats typically were classified and evaluated using the CDFG's A Guide to Wildlife Habitats of California.[6]

There are four main vegetation communities found within the Project area: brackish marsh; freshwater marsh; upland woody vegetation, including developed/landscaped (of which the inboard woody vegetation is being treated as 'riparian' by CDFW); and, ruderal/non-native annual grassland (see representative photos in **Figures 4-9**). Details on each community and its location within the project area are discussed below.

2.1 JURISDICTIONAL WATERS

Jurisdictional delineations of federal waters and wetlands have been conducted for Lower Berryessa,[7] and Calera creeks; the extent of jurisdictional waters of the U.S. for both creeks within the Project area has been verified by the U.S. Army Corps of Engineers (Corps)[8]. For the Lower Berryessa Creek project element, the federal jurisdictional delineation was conducted and verified in 2004.[9] However, verifications are valid for only five years. Therefore, the extent of jurisdictional waters of the U.S. for Lower Berryessa Creek was re-assessed and a request for verification was submitted to the Corps in 2010.[10] Wetland delineations of federal waters and wetlands for Lower Calera Creek were conducted and verified in 2005[11] and an extension of the verification was requested of the Corps in 2010[12].The below descriptions combine the results from these delineation efforts.

The majority of the jurisdictional waters of the U.S. located within the Project area are considered to be: freshwater marsh; brackish marsh; or, non-wetland "other waters" that are located within the ordinary high water mark (OHWM). One exception to the dominant freshwater and brackish marsh wetland types observed is a small seasonal wetland adjacent to a proposed construction staging area, located about the 75 ft from the east bank of Lower Berryessa Creek and upstream of the Abel Street Bridge.

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[3] The California Department of Fish and Game (CDFG) formally changed its name to the California Department of Fish and Wildlife (CDFW) on January 1, 2013. In this document, references to literature published by CDFW prior to Jan. 1, 2013 are cited as 'CDFG'. The agency is otherwise referred to by its new name, CDFW.

[4] CDFG, 2010.

[5] Sawyer and Keeler-Wolf, 1995.

[6] Mayer and Laudenslayer, 1988.

[7] The extent of federally jurisdictional waters and wetlands for the Lower Berryessa Creek element, at its confluence with Lower Penitencia Creek, was not included in original delineations, but was estimated for approximately 30 linear feet of Lower Penitencia Creek based on aerial imagery and consistency with surrounding habitat classifications.

[8] Corps, 2004, 2005.

[9] ESA, 2004.

[10] ESA, 2010a,b.

[11] ESA, 2005.

[12] ESA, 2010c.

State-regulated aquatic habitats may extend beyond those areas identified as federally jurisdictional. Under the Porter-Cologne Water Quality Control Act, all surface waters, including ground waters, are subject to state regulation, regardless of their connection to navigable waterways. Furthermore, areas adjacent to waters, where activities or the placement of pollutants could impair water quality or other beneficial uses, may also be subject to state regulation by the SFRWQCB. Under Sections 1600-1616 of the California Fish and Game Code, creeks, lakes and water bodies are protected as wildlife habitat. Jurisdictional waters and other regulated habitats are discussed by type, below, and are quantified and listed by type in **Table 1**, below.

TABLE 1
EXISTING STATE AND FEDERAL JURISDICTIONAL WATERS AND OTHER REGULATED HABITATS IN THE PROJECT AREA

Jurisdictional Waters	**Sq Ft[a]**	**Acres[b]**
Berryessa Creek		
Brackish/Freshwater Marsh/Seasonal Wetland	201,377	4.62[c]
Other Waters of the U.S. (Berryessa Creek)	158,341	3.64
Berryessa Creek Jurisdictional Waters Total	*359,718*	*8.26*
Calera Creek		
Brackish/Freshwater Marsh/Seasonal Wetland	24,655	0.57
Other Waters of the U.S. (Calera Creek)	21,070	0.48
Calera Creek Jurisdictional Waters Total	*45,725*	*1.05*
Penitencia & Tularcitos Creek*s*		
Brackish Marsh	1,224	*0.03*
Other Waters of the U.S.	2,029	*0.05*
Penitencia & Tularcitos Creek*s Jurisdictional Waters Total*	3,523	*0.08*
Total Jurisdictional Waters	**409,028**	**9.39**
Other Regulated Habitats Below Top-of-Banks		
Adjacent Upland Vegetation		
Inboard Levees (mostly non-native landscape trees and shrubs, being treated as 'riparian' by CDFW)	52,476	1.20
Developed and Ruderal/Non-Native Grassland	733,114	16.83
Total of Other Regulated Habitats	**1,194,618**	**18.03**
Total Jurisdictional Area	**1,446.192**	**27.42**

a Square feet were calculated using GIS (ArcMap 9).
b Acreages were calculated using GIS (ArcMap 9) and were rounded to the nearest one-hundredth acre.
c Includes 0.015-acre isolated wetland near Abel Street that will not be impacted.

SOURCES: ESA, 2004, 2005, 2010a,b,c

Brackish Marsh

Brackish marsh wetlands are located in Lower Berryessa Creek, downstream from the railroad crossing at Abel Street. The brackish marsh wetlands in the Project area are a result of tidal influx, and are distinct from the wetlands upstream of Abel Street in that they support both a greater percentage of (and greater cover by) perennial species. Brackish marsh vegetation occupies the shallow margins of the channel and, in some locations, narrow bars in the middle of the channel.

Vegetation is dominated by California bulrush (*Schoenoplectus californicus*) and water smartweed (*Polygonum* sp.); both of which are obligate wetland species. Willow-leaf dock (*Rumex salicifolius*), common water plantain (*Alisma triviale*), and floating water primrose (*Ludwigia peploides*) occur as associates.

Freshwater Marsh

Within the project area, freshwater marsh is the dominant form of wetland and includes both vegetated areas and pockets of open water within the channels. Freshwater marsh occurs along the edges of the creek channels and occupies most of the channel in reaches with sediment accumulation, resulting in reduced water flows and the establishment of more freshwater marsh vegetation. Open water areas tend to occur in deeper waters within the low-flow areas of the channel. Since the creeks are managed flood control channels, the location of freshwater marsh and open water habitats are dynamic and shift from year to year depending on annual rainfall.

Dominant freshwater marsh species, including floating water-primrose and watercress (*Nasturtium officinale*), are found throughout the Lower Berryessa Creek corridor. Barnyardgrass (*Echinochloa crus-galli*), a non-native annual grass, is also an occasional dominant species. Stands of cattail (*Typha latifolia* and/or *T. angustifolia*) and California bulrush are associated species and are found in limited areas within the program area.

2.2 UPLAND VEGETATION

Upland habitat types are predominantly characteristic of developed and landscaped areas, as well as sparsely vegetated, ruderal, non-native grasslands. A summary of the habitat is provided below; and, a more comprehensive floristic description is provided, by reach, in **Exhibit A** Existing Species Composition and Cover: Survey Notes, attached. Refer to **Figures 4-10** for representative images of the vegetation in and along Lower Berryessa and Lower Calera creeks.

Upland Woody Vegetation on Inboard Levees / Riparian

No native riparian habitat exists in the Lower Berryessa Creek and Lower Calera Creek Project However, upland woody vegetation comprised primarily of discontinuous, scattered tree and shrub plantings and exotic invasive species is found on the inboard and outboard slopes of the existing levees of Lower Berryessa Creek (see **EXHIBIT B**, which presents annotated Aerial Photographs and a Table depicting 'Riparian' and upland trees). The SCVWD considers these habitats, if located on the inboard slopes, as 'riparian' habitat consistent with direction from CDFW.

Developed / Landscaped

Developed or landscaped areas in the Project area typically contain non-native or ornamental species. Generally these areas support no native vegetation, although there are several city parks adjacent to sections of Lower Berryessa Creek where ornamental cultivars, including ceanothus (*Ceanothus* sp.) and holly oak (*Quercus ilex*) are found.

Ruderal / Non-Native Grassland

Ruderal communities consist of weedy vegetation that typically occurs in areas where soils and native vegetation have been significantly disturbed by activities such as vegetation management, including herbicide applications and mechanical methods, resulting in a predominance of non-native species. This community, which also could be classified as non-native annual grassland,

occurs above the ordinary high water mark along the levee banks (inboard levee slopes) and along the outside of the levee maintenance roads (outboard levee slopes).

This habitat type is represented in the Project area by non-native annual grasses and an assortment of non-native forbs. These species include wild oats (*Avena barbata*), annual ryegrass (*Festuca perenne*), bristly oxtongue (*Helminthotheca echioides*), poison hemlock (*Conium maculatum*), yellow star-thistle (*Centaurea solstitialis*), and wild radish (*Raphanus raphanistrum*).

Figure 4. West view of Lower Berryessa Creek (Reach A), looking downstream toward the Lower Penitencia Creek confluence.

Figure 5. Northwest view of Lower Berryessa Creek (Reach D) with the Abel Street Bridge in the background.

Figure 6. East-southeast view of Lower Berryessa Creek (Reach E), looking upstream, with N. Milpitas Drive in the background.

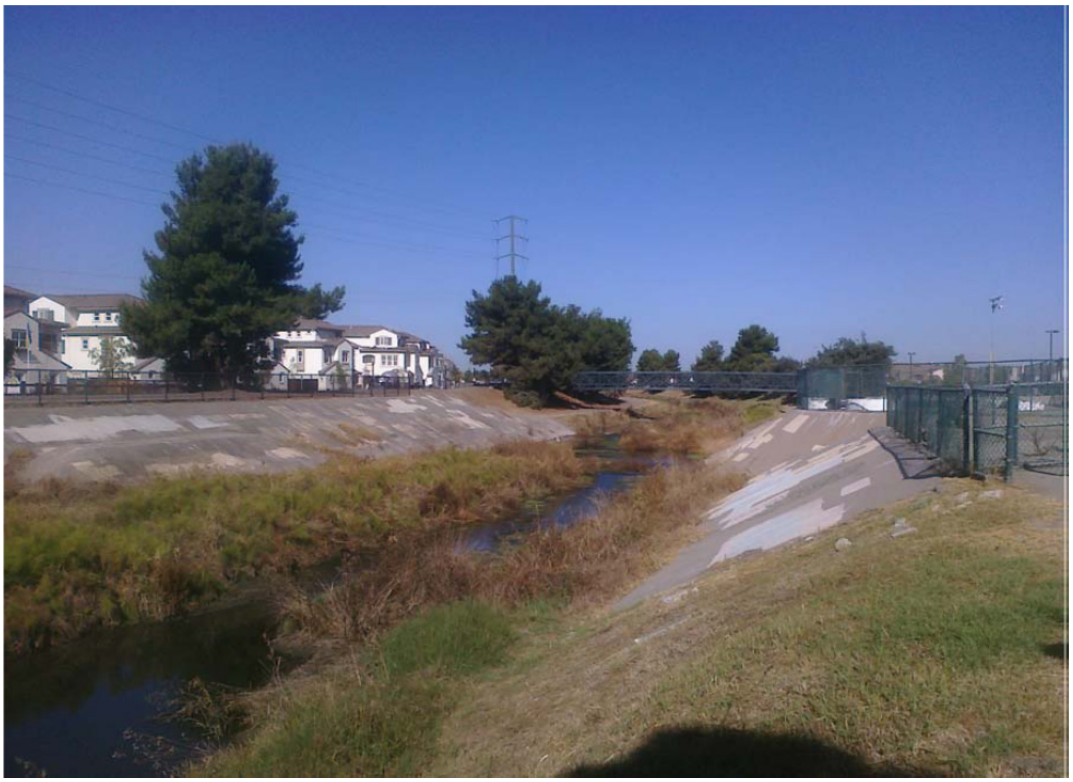


Figure 7. Northwest view of Lower Berryessa Creek (Reach F), looking downstream near Paseo Refugio.

Figure 8. West view of Lower Calera Creek Reach A

Figure 9. East view of Lower Calera Creek (Reach B), looking upstream from sidewalk on N. Milpitas Blvd.

Figure 10. East view of Lower Calera Creek (Reach B), looking upstream from Arizona Ave.

Section 3.0 Impacts and Mitigation

All anticipated impacts to fish, wildlife, and plant resources in the Project area will be temporary only. Project implementation will result in the widening of existing channel cross-sections and the increase in overall channel area, thereby providing an opportunity for increased channel habitat in the form of open waters, riparian habitat, and wetlands (including jurisdictional waters and wetlands), while also time improving flood protection and improved maintenance access for channel maintenance purposes. At the conclusion of project construction, native streambed soils will be re-installed in the channel to the extent practicable, natural streambed contours will be established, facilitating restoration/creation of open water habitat. The SCVWD will also actively plant riparian and wetland species, to expedite the revegetation of these habitats and compensate for temporary project impacts.

The SCVWD considers the proposed mitigation as sufficient to address the anticipated temporary impacts, when viewed in light of:

1) avoidance of all permanent impacts;
2) widening of channel which creates additional area for active revegetation of wetlands and riparian habitats,
3) proposed compensatory mitigation through the active establishment of wetland habitat within the creek bed and riparian habitat on low earthen benches created within the creek channel
4) the well-founded expectation of successful habitat revegetation and creation via facilitation of natural re-growth, combined with active installation of seeds/plants/cuttings (documented in the SCVWD's Instream Wetland Vegetation Regrowth Study[13]).

3.1 EIR MITIGATION MEASURES

Mitigation measures developed for the Environmental Impact Report (EIR; ESA, 2011) provide guidance for compensatory mitigation of project impacts to sensitive habitats within and adjacent to Lower Berryessa Creek and Lower Calera Creek. The relevant EIR mitigation measures are presented below.

Jurisdictional Waters

Mitigation Measure 3.D-4b: *Compensate for Loss[14] [of Jurisdictional Waters]*

"Prior to construction of the Program, the District shall obtain permits and authorizations from the Corps, SFBRWQCB, and CDFG. Consistent with the terms and conditions of these permits and authorizations, the District shall compensate for the unavoidable loss of jurisdictional waters at a minimum of a 1:1 ratio. Compensation may be provided by one or more of the following methods: 1) on-site creation or restoration; 2) off-site creation, or restoration; or, 3) payment to an approved wetland mitigation bank. A mitigation and monitoring plan (MMP) shall be developed that describes how temporary and permanent impacts shall be compensated for, including active seeding or planting in the event that natural recruitment does not occur as anticipated within the first two years following construction, and shall present a feasible

[13] Instream Wetland Vegetation Regrowth Study, Fourth Annual Report: Results for 2001. July 2002. This study found that wetlands within disturbed channels typically return within one to two years after disturbance.

[14] Lower Berryessa Creek Program, Final Environmental Impact Report (SCH#2007092084). December 2011.

revegetation plan with monitoring protocols to ensure the Program does not result in a net loss of jurisdictional waters."

As detailed below, in 3.2 *Project Impacts and Compensatory Mitigation*, the District has modified this EIR compensatory mitigation measure to go beyond natural recruitment and proposes to proactively create and restore wetlands and riparian habitat immediately following each season of construction. SCVWD will restore the existing brackish and freshwater/seasonal wetlands and increase their acreage compared to existing. The wetlands acreage in Lower Berryessa Creek will increase from 4.61 ac to 5.13 ac in Lower Berryessa Creek and from 0.57 to 1.2 ac in Lower Calera Creek. The wetlands in Lower Penitencia and Tularcitos Creeks will remain the same as existing at 0.03 ac. Overall, the area of jurisdictional wetlands will increase from the existing 5.21 ac to 6.33 ac, an increase of 21%. The compensation ration for temporary impacts to wetlands will be 1.2:1.

The project will recreate the existing low flow channels of Lower Berryessa and Lower Calera Creeks after construction is complete. The area of open water habitat, including the proportion subject to tidal influence, will be unchanged from the pre-construction conduction. Compensation ratio for open water habitat in the project area, and in each individual creek, will be 1:1

Upland Vegetation

Mitigation Measure 3.D-6a: *Tree and Shrub Replacement*[15]

"Prior to the start of construction, the District shall have a qualified biologist conduct a survey to identify the trees and shrubs that would be removed during construction. Trees shall be identified by species and a determination shall be made of areal coverage of the tree canopy. The District shall prepare a tree replacement plan that requires planting of: 1) trees of species similar to those removed, or of a native species; and, 2) complimentary shrubs. Replacement shall be at a minimum, anticipated 1:1[16] areal coverage ratio at maturity. Following initial excavation and earthwork, tree and shrub replacement shall include tree, shrub, and other plantings in suitable areas located off of levee slopes. The plantings shall reflect the structure and density of trees and shrubs as identified in the preconstruction survey, such that the overall character, and quality, of views from the creek roads/trails are restored on-site, to the extent feasible. Where planting trees and shrubs within the same site, or within the District's ROW, is not feasible (e.g. on the levee slope within the District ROW that could reduce channel capacity, as described in Section 2.E, Program Description [of the EIR] where soils within the ROW would not support plantings; or where plantings would compromise the objectives of the Program), the District shall coordinate with the City of Milpitas to find suitable, alternative location(s) for the replacement plantings. The District shall monitor tree replacement plantings annually for a minimum of three years after completion of construction to ensure establishment of the plantings and, if necessary, shall replant to ensure the success of the replacement plantings."

In agreement with the CDFW, and based upon the project size, areal extent of tree coverage, and low-quality of the existing inboard slope vegetation, the District has complied with the above condition through the remote evaluation tree canopy cover using aerial imagery and ground truthing (see **EXHIBIT B**, Annotated Aerial Photo Showing Impacted Upland Vegetation).

[15] Ibid.

[16] As noted in the text, above, taken directly from the FEIR, the mitigation ratio to which the SCVWD committed was 1:1. However, in response to a comment from CDFW in their Incomplete Notification letter, dated May 29, 2013, the low bench to be built as part of the Lower Berryessa Creek project will be planted with riparian vegetation, as described in Section 4.0., in an amount sufficient to satisfy CDFW's request for mitigation at a ~2:1 ratio (1.93:1, based on the creation of 2.32 acres to mitigate for 1.20 acres of impact).

As detailed below, in 3.2 *Project Impacts and Compensatory Mitigation*, the District has modified this EIR compensatory mitigation measure to go beyond provision of compensatory mitigation at a 1:1 ratio, and is proposing a ~ 2:1 compensatory mitigation ratio, to be accomplished through the active planting of riparian species on created in-channel low earthen benches, immediately following construction.

3.2 PROJECT IMPACTS AND COMPENSATORY MITIGATION

Construction of the proposed flood improvements to Lower Berryessa, Lower Calera, Lower Penitencia, and Tularcitos Creeks will result in unavoidable temporary impacts to approximately 5.21 ac of existing jurisdictional brackish and seasonal wetlands; 4.17 acres of existing non-vegetated, open water habitat, including tidal waters; and 1.20 acres of existing riparian/upland woody vegetation (see **EXHIBIT B**); and 16.83 ac of adjacent ruderal, annual grassland habitat, also from the Lower Berryessa Creek project-level element and found on the inboard slopes of the existing levees,[17] for a total of 27.4 acres of regulated habitat. All impacts are considered temporary, as there will be no net loss of riparian or in-stream habitat resulting from project implementation. and all areas will be actively revegetated within one year of completion of construction on teach channel reach. **Table 2** below provides a breakdown of impacted aquatic and upland habitats in Lower Berryessa and Lower Calera Creeks along with acreage of habitats that will be established following project completion, and the resulting mitigation ratios.

Mitigation for temporary project impacts to jurisdictional wetlands and waters of the U.S. will be carried out at each affected Reach of Lower Berryessa Creek and Lower Calera Creek in the same year that construction disturbance occurs. Wetland, riparian, and upland habitats will be established in conformance with the Revegetation Plan (Section 4.0).

Project construction would result in a 1.15-acre net increase in jurisdictional waters (expected to consist of wetland habitats), through the excavation and widening of the channel of Lower Berryessa Creek and Lower Calera Creek. Project construction would also result in a 1.12-acre net increase in riparian habitat (according to the CDFW definition), through the creation and planting of low earthen benches within the widened channel of Lower Berryessa Creek. Channel widening will be accomplished by replacing the existing earthen levee on the southwest bank of Lower Berryessa Creek with a concrete floodwall, and relocating the existing earthen levee on the south bank of Lower Calera Creek outward from the channel. The result will be an increase in channel widths, depths, and hydraulic capacity.

[17] Upland landscaped vegetation located on the outboard slopes would not be considered an impact to CDFW-regulated resources, and would be mitigated off-site, in accordance with mitigation commitments made in the FEIR, which would address the aesthetic impact of this landscaped vegetation loss.

TABLE 2
PROJECT IMPACTS AND PROPOSED COMPENSATORY MITIGATION

Habitat / Parameter	Lower Berryessa Element	Lower Penitencia / Tularcitos Creeks	Lower Calera Element	Overall Project
Project Area (top of bank to top of bank/floodwall)				
Impacted (ac)	29.60	0.11	3.48	33.19
Proposed (ac)	35.90	0.11	5.53	41.54
Project Length (ft)	8,593	105	3,130	11,723
Open Water				
Impacted (ac)	3.64	0.05	0.48	4.17
Proposed (ac)	3.64	0.05	0.48	4.17
Comp Ratio	1.0	1.0	1.0	**1.0**
Wetlands (brackish/freshwater)				
Impacted (ac)	4.61	0.03	0.57	5.21
Proposed (ac)	5.13	0.03	1.2	6.36
Compensation Ratio	1.1	1.0	2.1	**1.2**
Riparian				
Impacted (ac) (Holly oak)	1.20	0	0	1.20
Proposed (ac) (native trees)	2.32	0	0	2.32
Compensation Ratio	1.93	n/a	n/a	**1.93**
Upland Grass/Ruderal				
Impacted (ac) (non-native spp.)	14.79	0.03	2.01	16.83
Proposed (ac) (naturalized/native spp.)	20.50	0.03	1.68	22.21

Section 4.0 Revegetation Plan

4.1 REVEGETATION DESIGN

The revegetation design includes (1) reestablishment and new creation of open water and wetlands within active stream channels of Lower Berryessa and Lower Calera Creeks, (2) establishment of improved riparian habitat on low earthen benches adjacent to the low flow channel within Lower Berryessa Creek, and (3) hydroseeding of upland areas and levee slopes with a native grass species mix to prevent erosion and provide upland habitat. These components are described in greater detail below.

Wetlands and Open Water

Compensation for the temporary removal of 4.17 ac of open water habitat will be achieved through re-watering of the newly created low flow channel, establishing a total of 4.17 ac of open water habitat at the end of the project. The hydrology and drainage area of the creeks in the project area will remain unchanged. The post-construction channels of Lower Berryessa and Lower Calera Creeks will contain graded low-flow channels approximating the dimensions of the existing low-flow channels. Each creek reach will be re-watered at the end of the construction season, limiting the duration of impact to open water habitat in each creek reach to one construction season (i.e. about 4.5 months). The proposed Compensation ratio is 1:1 (proposed:existing).

Compensation for the temporary removal of 5.21 ac of existing brackish and freshwater wetlands would be accomplished through active planting and adaptive management to establish 6.36 ac of wetlands. The proposed compensation ratio for these temporary impacts is 1.2:1 (proposed:existing). Areas in the creek beds adjacent to the low-flow channels of Lower Berryessa and Lower Calera Creeks will be actively re-vegetated The planting areas will be excavated to the design depth during channel reconstruction. Immediately after each creek reach is dewatered, wetlands plants and soil will be salvaged from the active creek reach. Existing perennial wetland plants will be salvaged first, making sure to harvest all rhizomes and root mass. The plant material will be kept moist at the staging area, so that roots and rhizomes do not dry out. The uppermost 6 to 12 inches of topsoil will be salvaged from existing wetlands and stored at the construction staging areas for re-use at the site, to the extent practicable. Salvaged wetlands plant and soils will be stored at project staging areas for the duration of the construction period, roughly 4.5 months. Dry topsoil will be stored on an existing pavement or plastic sheeting (if on unpaved soil) at the staging areas, to prevent contamination by seeds present at the staging area. The topsoil is expected to contain substantial seed from existing vegetation that will promote rapid revegetation when re-spread at the wetlands re-establishment and creation areas.

Wetland areas will also be actively planted with native perennial wetland vegetation from container stock, and local cuttings, to supplement the salvaged plants from the channel and topsoil seed bank. Container stock can be obtained from local native plant nurseries or contract harvested and grown by a local nursery utilizing seed and propagules from the Coyote Creek watershed. The revegetation areas within the newly constructed creek reaches will be planted and adaptively managed to promote re-establishment of habitat, including a 22% increase in area of wetlands habitat compared to existing area.

Riparian Benches

Compensation for the removal of 1.20 acres of mostly exotic landscape trees and shrubs located in upland habitat on the inboard levee slopes (and deemed 'riparian' by CDFW) will be accomplished through the value-added installation of riparian vegetation on low, earthen benches created within the channels. The planted benches will occupy a total of 2.32 acres within the improved channel cross-sections of Reaches D, E, and G of Lower Berryessa Creek. No riparian vegetation exists or would be affected in Lower Calera Creek (or the small affected sections of Lower Penitencia or Tularcitos Creek); riparian benches are not proposed for those creeks. The proposed locations of the earthen benches in Lower Berryessa Creek are shown on plan sheets C-1 through C-7 of **EXHIBIT C** and summarized in **Table 3**, below. A conceptual cross-section of the riparian benches is also provided in sheet 11 of EXHIBIT C. Care will be taken during excavation and soil salvage activities, to the minimize disturbance of the existing subsoil structure. To create the necessary micro-topography for re-establishment and creation of new riparian habitat, coarse channel deposits salvaged during construction will be placed above the clay substrate with a 1 to 2% slope towards the low-flow channel. The underlying clay will minimize downward percolation of moisture and promote lateral movement within the overlying coarse sediments, delivering water to the planted vegetation. Newly planted materials will be irrigated if necessary to promote survival and growth, as described in section 4.5.

TABLE 3
PLANTED RIPARIAN BENCH LOCATIONS – LOWER BERRYESSA CREEK

Area	Reach	Plan Sheet #	Approx. Station	Approx. Station	Length (ft)	Bench Width (ft)	LOW BENCH FOOTPRINT AREA	
							Ft^2	Acre (AC)
1	D	C4 and C-5	38+00	53+83	1,583	34	53,822	1.24
2	D,E	C6 and C-7	59+04	77+04	1170	31	36,270	0.83
3	G	C-7	76+00	79+50	350	31	10,850	0.25
	Total low bench length				3,103			
	Total low bench area						100,942	2.32

The benches will be located on the channel bed at an elevation of 1 to 2 ft above the low-flow water surface and in close proximity to the low-flow channel. Riparian vegetation will be planted on the bench at a distance of 15 feet from the base of the levee to avoid levee damage from tree roots and adhere to U.S. Army Corps of Engineers policy. Tree canopies will be allowed to grow over the 15-ft setback zone, and a full canopy over the riparian bench will grow in the long term. Each bench will be stabilized with a combination of jute netting covering the surface benches and ½ ton rock riprap at the perimeter of the benches as depicted in plan sheet 11 (EXHIBIT C). The rock riprap will form an erosive barrier at the inner edge of the benches and will anchor the jute netting, therefore reducing the potential for erosion of the benches.

Herbaceous Uplands

The project will temporarily disturb the existing 16.83 acres of ruderal/upland habitat located on inboard levee slopes. This habitat contains all project areas other than open water, wetlands, and riparian habitat, and hardscape elements (e.g. roads surfaced with cellular concrete mats (CCMs) or compacted decomposed granite, concrete bed linings, grouted and ungrouted rock riprap) and will be hydroseeded with a naturalized see mix, and at a minimum, restored to pre-

construction conditions. The area of post-construction uplands will be 22.21 ac as compared to the 16.83 ac of impacted upland grass/ruderal. A species list and hydroseeding notes for upland areas are included in section 4.2 (Herbaceous Plant Installation).

4.2 PLANT SELECTION AND INSTALLATION

Wetland Plant Installation

The objective is to replace and increase wetlands habitat values in the long-term by actively revegetating wetlands in the channels of Lower Berryessa and Lower Calera Creeks and managing them to achieve long-term sutainability. Native, perennial wetland plants will be installed in Lower Berryessa Creek and Lower Calera Creek within the channel, once construction work in the channel is complete and previously slavaged and stored topsoil has been respread. The total wetland planting area encompases 5.16 ac of Lower Berryessa Creek (including the 0.03 ac planting area in Lower Penetencia Creek) and 1.20 ac of Lower Calera Creek, and consists of the entire stream bed of these channels outside of the low flow channel, riparian benches, and areas of retained existing concrete bed linings. Wetlands re-establishment and creation will between the low-flow channel and the levees on the northeast side of Lower Berryessa Creek and the north side of Lower Calera creek. Wetlands habitat will be re-established in Lower Berryessa Reaches A, B, C, D, and G and Lower Calera Reaches A and B.

Wetlands will be revegetated by spreading salvaged topsoil rich in annual seeds in these areas, and then installing cuttings and container plants. **Table 4** presents the planting palette for the wetland areas adjacent to the low-flow channel. Container stock is intended to supplement the perennial wetland vegetation that is salvaged from the channels prior to construction. Herbaceous perennial plants ranging from obligate[18] wetland species to facultative[19] wetland species are proposed. Plants will be arranged within the wetland planting areas with obligate wetland species closest to the low flow channel and facultative wetland species at the upper potions of the planting area, farther from the open water. The result will be a mosaic of annual and perennial wetlands species.

TABLE 4
PLANTING PALETTE FOR WETLAND PLANTS

Species Name	Common Name	Container size	Wetland status
Bolboschoenus maritimus	Alkali bulrush	Tree pot (1 gallon)	Obligate
Schoenoplectus californicus	California bulrush	Tree pot (1 gallon)	Obligate
Juncus balticus	Baltic rush	Leach tube (LT5)	Facultative Wetland
Juncus effuses	Spreading rush	Leach tube (LT5)	Facultative Wetland
Baccharis douglasii	Salt marsh baccharis	1 gallon	Facultative Wetland
Euthamia occidentalis	Western goldenrod	1 gallon	Facultative Wetland
Elymus triticoides	Creeping wildrye	Plug	Facultative
Typha ssp.	Cattail	1 gallon	Obligate

[18] Obligate wetland plants are those that occur only in wetlands and require saturated soil conditions.
[19] Facultative plants are those that occur in both wetland and upland habitats and can persist in saturated or well-drained, dry soils.

Riparian Plant Installation

Riparian benches adjacent to the main channel of Lower Berryessa Creek will be planted with a mix of woody riparian tree and shrub species with herbaceous patches for structural diversity (**Table 5**). Willow and mulefat stakes will make up the bulk of the planting material and can be harvested locally. Container stock of western goldentop, California aster, California rose, California blackberry, elderberry and creeping wildrye will supplement the willows and mulefat.

TABLE 5
RIPARIAN PLANT PALETTE

Species Name	Common Name	Propagule Type
Salix lasiolepis	Arroyo Willow	Cutting
Salix laevigata	Red Willow	Cutting
Baccharis salicifolia	Mulefat	Cutting
Baccharis douglasii	Salt marsh baccharis	1 gallon
Sambucus nigra ssp. *caerulea*	Sandbar willow	4”x14” tree pot
Elymus triticoides	Creeping wild-rye	Plugs
Euthamia occidentalis	Western goldentop	1 gallon
Rosa californica	California wildrose	Dee Pot
Rubus ursinus	California blackberry	1 gallon
Symphyotrichum chilensis	California aster	1 gallon

Riparian benches range in width up to 32 feet and planting arrangement of the woody species will be random. Woody vegetation cannot be planted within a minimum planting distance of 15 feet from the base of the levee in order to protect levee structure, based on requirements from the Corps (Corps, 2010). However, tree canopies can grow over this setback area and shade it.

Container Stock

The number of container plants required will be determined in the construction plans and specifications. All container-grown plant stock will be of local origin. The following recommendations are provided to ensure successful planting and establishment within the mitigation areas.

- Whole plant installation shall occur between October 1st (or the onset of the rainy season, if later) and December 1st to take advantage of winter rains and moist soil conditions;
- Cuttings will be installed during December and January when plants are dormant; and
- Planting layouts will be finalized in the field by the Revegetation Monitor. Plant locations and species will be indicated with colored pin flags.

At the time of planting, the Revegetation Monitor will coordinate the placement of flags to denote planting sites for individual plants.

Willow Stakes or Pole Cuttings

Willow and mulefat stakes will be installed on the riparian benches, described above. Cuttings will be taken from a variety of large, healthy shrubs and trees in the Coyote Creek watershed in proximity to the Project area, to the extent practicable. Native willows are present both up and

downstream of the project sites within the Coyote Creek watershed. Potential suitable locations for harvesting willow stakes include, but are not limited to:

- A stretch of Coyote Creek/Coyote Creek trail between McCarthy on the north and 237 on the south.
- Lower Berryessa Creek north of Milmont Drive.

Herbaceous Upland Plant Installation (Hydroseed)

Hydroseeding of native upland grasses is proposed for the levee banks and buffer areas between the riparian benches and levees. A plant palette for native grass hydroseed mix is provided in **Table 6**, below. Application will occur between as close as possible to the beginning of the rainy season. The hydraulic mixture (seed and mulch slurry) will not be applied when rainfall is anticipated within 24 hours.

TABLE 6
HYDROSEED PLANT PALETTE

Species Name	Common Name	Rate (lbs./acre)	Propagule Type
Bromus carinatus	'S. F. Bay Area' California brome	10	Pure Live Seed (PLS)
Elymus glaucus	'Berkeley' Blue wild-rye	12	PLS
Hordeum brachyantherum ssp. californicum	Prostrate California barley	16	PLS
Vulpia microstachys	Three Weeks fescue	5	PLS

Hydraulic equipment will be used to provide a uniform application of the seed and mulch slurry using water as a carrying agent. The seed and mulch will be mixed and applied simultaneously. The mix will be conditioned for a minimum of 15 minutes and maximum of 30 minutes before application (minimum conditioning time may vary with mulch manufacturer's specifications; seed should not rest in the water slurry for more than 30 minutes prior to application). The mixture will be applied so that no gaps exist between the hydromulch matrix and the soil, and there are no holes greater than one millimeter in the matrix.

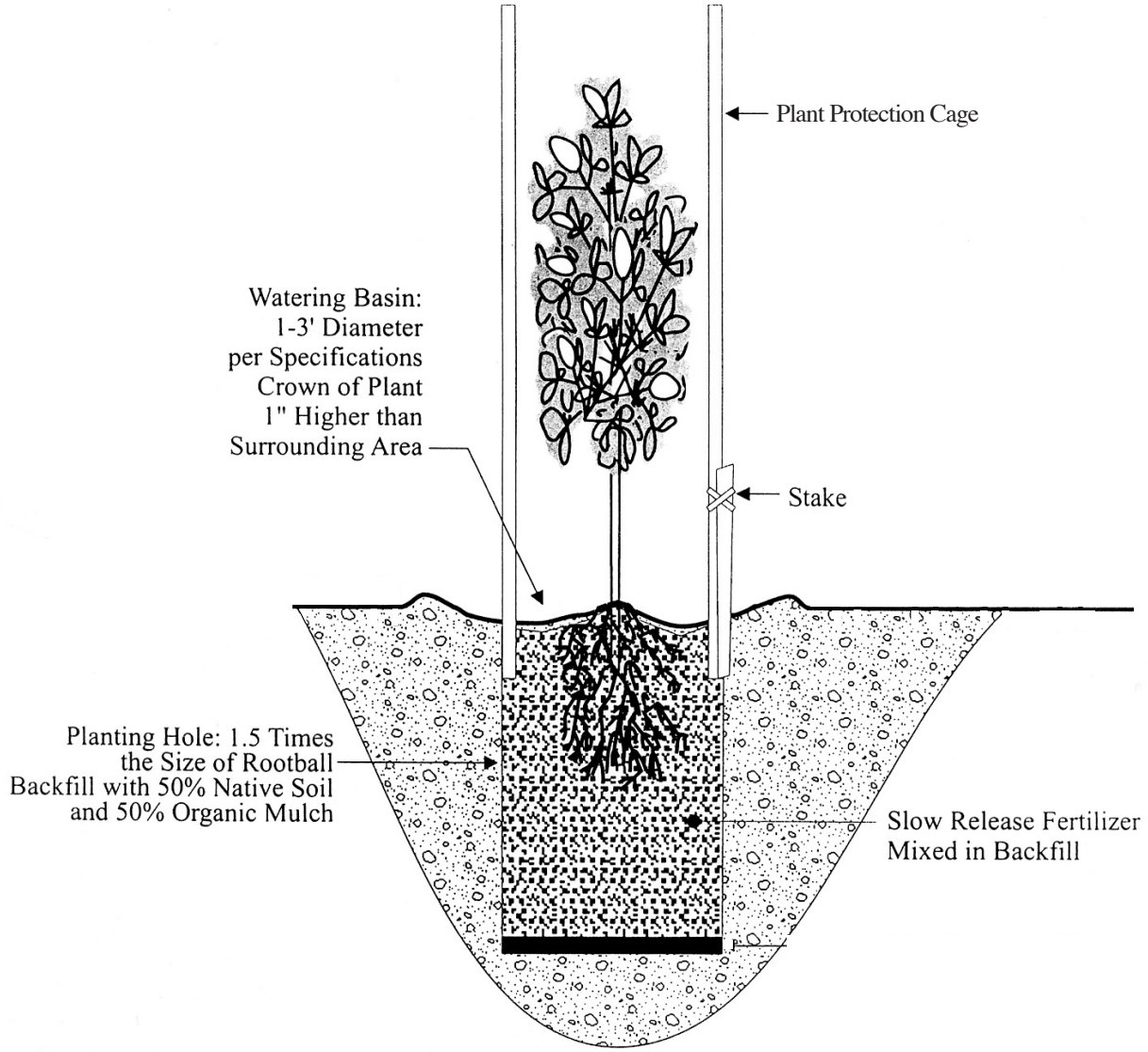
4.3 CONSTRUCTION SCHEDULE

Construction of the flood control project is expected to occur during the dry season construction period over three years, as shown in **Table 7**.

TABLE 7
CONSTRUCTION SCHEDULE BY CREEK AND REACHES

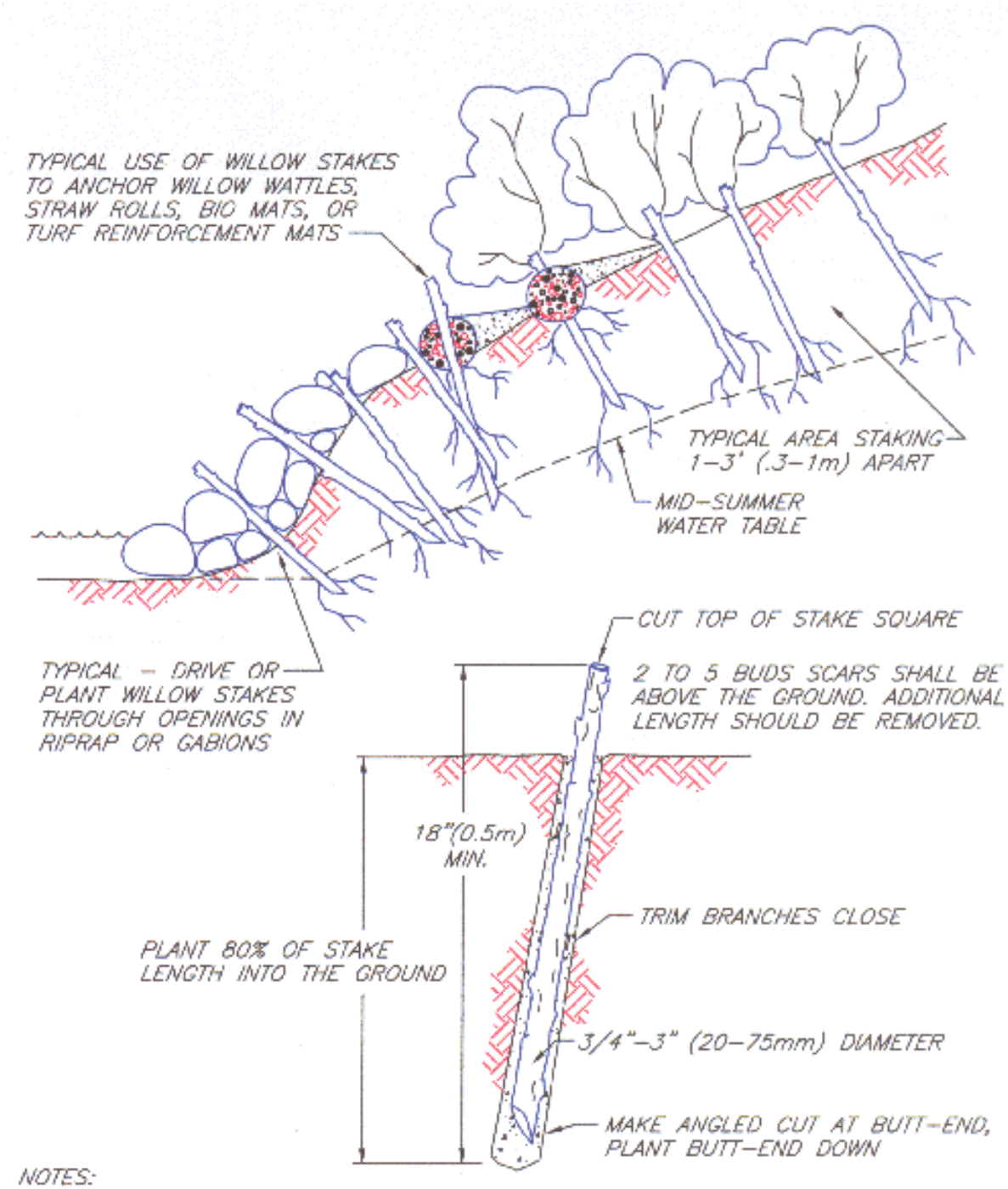
Creek	Reaches	Construction Year
Lower Berryessa	A and B (downstream of Abel Street Bridge)	2014
	C, D, E, F, and G (upstream of Abel Street Bridge)	2015
Lower Calera	A and B	2016

To avoid potential impacts to longfin smelt, which may utilize tidally-influenced portions of Lower Berryessa Creek and Lower Calera Creek in the spring and fall, construction in Reaches A and B of Lower Berryessa Creek(planned for 2014) and in Reach A of Lower Calera Creek (planned for 2016) would not begin earlier than June 1.



PLANTING NOTES:
1. PLANTING HOLES TO BE DUG ONE AND A HALF TIMES LARGER THAN ROOTBALL.
2. PROVIDE FOUR INCH DOWNSLOPE BERM TO RETAIN WATER ON SLOPES.

Figure 11
Typical Tree and Shrub
Planting Specifications



NOTES:
1. HARVEST AND PLANT STAKES DURING THE DORMANT SEASON.
2. USE HEALTHY, STRAIGHT AND LIVE WOOD AT LEAST 1 YEAR OLD.
3. MAKE CLEAN CUTS AND DO NOT DAMAGE STAKES OR SPLIT ENDS DURING INSTALLATION, USE A PILOT BAR IN FIRM SOILS.
4. SOAK CUTTINGS FOR 24 HOURS (MIN.) PRIOR TO INSTALLATION.
5. TAMP THE SOIL AROUND THE STAKE.

NOT TO SCALE

SOURCE: John McCullah, Salix Applied Earthcare, 2000

Figure 12
Pole Stake Planting Detail

4.4 AS-BUILT DRAWINGS

As-built drawings of the installed mitigation will be provided with the first annual monitoring report.

4.5 RESPONSIBLE PARTIES

Prior to implementation of this MMP, SCVWD will designate one or more Revegetation Monitors. This person or persons will be a qualified biologist, restoration ecologist, or restoration consultant who will supervise the implementation of mitigation installation and long-term monitoring. The Revegetation Monitor shall be responsible for:

- Interpreting plans in the interest of a successful revegetation effort;
- Supervising site preparation;
- Approving all plant materials prior to installation;
- Overseeing field placement of plants, including placement of flags (color-coded by species) denoting locations for individual plants;
- Overseeing installation, including training and directing planting crews if necessary;
- Monitoring revegetation progress and reporting to SCVWD and/or regulatory agencies, as necessary;
- Providing guidance and instruction for ongoing maintenance to ensure the long-term, successful establishment of the plantings. If necessary, the Revegetation Monitor will train crews in the methods represented in this plan;
- Guiding remedial actions as needed to replace plants, so that performance standards and permit conditions are met; and
- Ensuring that non-native species removal complies with all state and federal requirements and training maintenance crews in proper techniques and best management practice for weed control, if necessary.

4.6 IRRIGATION

If necessary, a temporary irrigation system shall be installed, or temporary watering will be provided by a water truck for the first two to three years following installation.

4.7 RANGE OF CONTINGENCY MEASURES

In the event that riparian or wetland planting areas do not meet performance standards as outlined in this document, contingency measures will be implemented to maintain regulatory compliance. Contingency measures may include on-site remediation of wetland or riparian areas and additional plantings. On-site remediation would occur if plant survival and other performance standards are not met during any point in the monitoring period.

Remedial actions can also include reseeding or replanting of riparian or wetland habitats if it is determined that the vegetation component does not, and is unlikely to meet, the performance standards described in this MMP and in the regulatory permits for the project. Erosion control measures would be carried out as necessary to address slope instability and sediment transport within the creek corridor and planting areas.

The removal and/or eradication of non-native vegetation may be needed as an on-site remediation measure. The control of undesirable species would serve to improve habitat quality within all habitats.

The performance standards will provide a basis for determining the need for possible corrective actions. However, given the potential vagaries of weather patterns and other environmental conditions beyond the control of the project, failure to attain one or more of the performance standards will not necessarily imply that the mitigation has failed. Rather, the entire set of monitoring results will provide a basis for discussion with regulatory agencies as to whether remedial actions are warranted. Despite failure to attain one or more specific performance standards, monitoring results may suggest that the mitigated areas are developing properly, overall performance goals are being met, and that no corrective intervention would be warranted. Most importantly the performance standards are intended to be used and interpreted based on professional judgment of the Revegetation Monitors in consultation with regulatory agency staff.

4.8 PLANT ESTABLISHMENT PERIOD AND MAINTENANCE

In order to determine whether mitigation goals are being achieved, it is necessary to set performance standards. The monitoring of riparian and wetland planting areas and the success of these areas will be evaluated against general baseline conditions identified in the FEIR, wetland delineation and other environmental documentation prepared in coordination with the project. Typical performance standards include:

- At least 70 percent survival of installed plants for the first three years following planting;
- At least 70 percent native plant cover for riparian plant installations at the end of the five year monitoring period; hydroseeded areas will also exhibit at least 70 percent absolute cover, but this can be made up of a combination of native species used in the hydroseed mix and non-native annual grasses.
- Invasive plant species[20] that threaten the success of the habitat revegetation should not contribute relative cover greater than 50 percent in Year 1, decreasing to no greater than 30 percent by Year 5;
- At the end of the five-year monitoring period, all mitigation plantings must be self-sustaining and capable of survival without supplemental water;
- Excessive rills, gullies or other erosion features will not be allowed to persist within revegetation areas for each monitoring year;
- Irrigation must be removed or turned off for a minimum of two consecutive years (Years 4 and 5 at a minimum), and the mitigation areas must continue to meet all other performance standards during this period; and,
- Plants replacing individuals from the original installation that have died over the course of the monitoring period shall be monitored subject to the same criteria as the original installation for a period of five years from their date of planting, but may be curtailed as soon as percent cover performance standards are met.

[20] Not including annual grasses that have naturalized throughout California.

Section 5.0 Monitoring and Adaptive Management

5.1 MONITORING PROTOCOL

The planted areas of each creek reach will be monitored for 5 years following planting to determine plant survival rate, natural wetland recruitment, water levels, area of vegetative coverage, percent of non-native or upland plant cover, conditions that favor plant growth, and constraints adversely affecting plant success. Monitoring results will be used to adaptively manage the wetlands plantings for subsequent years. Species mix and numbers, spacing, lateral distance and elevation with respect to low-flow water surface will be adjusted to promote plant growth and long-term viability.

A monitoring approach will be developed during baseline monitoring and will reflect the individual site conditions, the performance standards in this MMP, and the methods presented below. A protocol describing this approach will be written by the Revegetation Monitor and referenced each year to ensure repeatable and accurate implementation of data collection methods. This monitoring protocol document will provide a step by step approach for collecting monitoring data, location of all monitoring points (transects, photo-points, etc.), and a list of materials needed / used.

5.2 METHODS

Percent Cover

One of the simplest methods for monitoring small scale vegetation change is through the use of line transects. This method is widely applicable to vegetation enhancement, habitat restoration, and weed removal projects, and measures percent cover of vegetation. Transects will be established at the time of planting. A sufficient number of transects to adequately assess performance of vegetation will be established within revegetation areas, with a minimum of one transect per 2,500 square feet of area. The same transects will be used throughout the monitoring period.

There are two types of commonly-used line transects: the line-intercept and the point-intercept. The line-intercept is the typical method used for woody perennial vegetation that has a large canopy at maturity and measures the distance that the crown of each plant, projected downwards vertically, intercepts the measuring tape. All distances for each individual species should then be added together. The percent cover for a species is the cumulative length of intercepts for each species divided by the length of the transect, or tape measure, multiplied by 100. This would be an appropriate method for measuring vegetation cover of the riparian benches.

The point-intercept method simply utilizes the same measuring tape laid on the ground and the monitor uses a pin flag to make observations at prescribed intervals by “dropping” the pin flag. Species names of all plants touching the pin are recorded at each point. If there is no vegetation touching the pin after it is dropped; “bare” is recorded. This method is useful in grassland or herbaceous wetland communities where it is not practical to use the line-intercept method. The total percent cover for a species or functional group (such as native or exotic) is calculated by dividing the number of times the pin encounters that species by the total number of times the pin is dropped. This would be an appropriate method for measuring wetland vegetation cover within the creek channel.

5.3 SURVIVORSHIP

Counting a statistically representative sample of installed riparian or wetland plants within the planting area provides a simple method for measuring survivorship. The count can be repeated during each monitoring event to determine how many of the initially planted species have survived.

5.4 HEALTH AND VIGOR

General health and vigor of all plantings will be recorded during monitoring to determine if the plants appear to be establishing and thriving. Documenting the health and vigor of each plant species will include:

- Evidence of stress from excessive or inadequate water;
- Evidence of disease;
- Evidence of browsing, burrowing, or vandalism that is causing plants damage or loss; and
- Evidence of topsoil erosion or roots exposure.

5.5 OVERALL SITE ASSESSMENT

Conditions will be assessed including: habitat characteristics (e.g. increase/decrease/new occurrence of invasive species infestations, general health and productivity of vegetation communities), observation of wildlife species, human disturbances, trash, and natural disturbances (tree fall, wind damage, drought), all of which may have an impact on the success of management actions. Observations will be recorded in a field notebook or standardized data form in the same manner during each site visit.

Site observations, in addition to photo-documentation will be used to assess any erosion or bank instability during the monitoring period. The Revegetation Monitor will record observations of bank failure, irregular sediment transport or deposition, and any changes within the channel.

5.6 PHOTO-DOCUMENTATION

Photo-documentation will be used to provide a qualitative assessment of overall site conditions, including vegetative dominance and structure, as well as changes in vegetative composition and cover over time. Photo-documentation is useful in documenting management projects of all sizes. Permanent photo-points will be established at project completion and identical color photographic scenes will be taken as a part of regular monitoring.

5.7 ANALYSIS OF RESULTS

Data will be collected in the field according to the methods described above. This includes both quantitative and qualitative data that will be entered into a database, written up, or otherwise saved in a place that can be easily retrieved for summarizing results and for comparison during the next monitoring event. To evaluate whether project goals and objectives are being met, SCVWD will compare the monitoring data and results to the performance standards and make conclusions about the extent to which goals are being achieved.

5.8 MONITORING AND REPORTING SCHEDULE

Annual monitoring reports will be submitted each year to the permitting agencies on December 31st or as specified in project permits. The first year report will summarize the baseline information as well as the first year monitoring results. Baseline information must include 'as-built' plans, drawings, or maps, that accurately depict what was planted and where. Thereafter, annual reports will consist of a summary of information contained in previous reports, as well as a presentation of the current year's results and discussion of any comparisons between years or trends noted.

Annual reports will include, at the minimum, the following information:

- Summary description of the monitoring methods, including data collection and analysis;
- An overview of the revegetation planting effort, including a general discussion of site conditions, changes since previous report, and quantitative comparisons (average growth by plant form (i.e. trees, shrubs, ground cover) and percentiles of cover and survival);
- Analysis of success in relation to performance standards;
- Color photographs of the revegetation areas taken from the same reference points on the ground and standardized with respect to direction, lens type, etc.;
- A map of the area with relevant features, and;
- A discussion of any corrective actions needed or undertaken (including exotic plant control efforts or replanting).

During the first and second year after riparian and wetland planting, all mitigation areas will be inspected for significant erosion or instability prior to the storm season and then during annual monitoring in the spring. Any identified unstable areas will require appropriate erosion control measures (e.g., netting, vegetation, silt fencing, straw, etc.). Appropriate erosion control measures will be applied to any identified unstable areas. During the third year, an erosion inspection will be carried out prior to the start of the storm season with erosion control measures applied to unstable areas.

Section 6.0 Plan Preparation Team

6.1 PROJECT SPONSOR

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6.2 MITIGATION AND MONITORING PLAN PREPARATION

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Section 7.0 References

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EXHIBIT A

Existing Species Composition and Cover: Survey Notes

California Circle to N. Abel St., Station 0+00 to 24+00

West Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee predominantly non-native, herbaceous with very few trees.
  - Composite [tree + shrub] aerial cover visually estimated at 5%. DBH range = 5-18 inches.
  - No shrubs present.
- Outboard levee is predominantly non-native, herbaceous with very few landscape trees/shrubs on fence line escaping from backyard landscaping.
  - Composite [tree + shrub] aerial cover visual estimate = 5%. DBH range 2-15".

East Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee is all non-native, herbaceous.
- Outboard levee [mostly at grade with levee road] predominantly non-native, herbaceous.
  - One exception found only around PG&E tower along last d/s two hundred feet of this reach. Old mixed landscape [planted natives + exotics].
  - Composite [tree + shrub] Aerial Cover = 75%, primarily exotic tree species, 15-25 ft tall, 3-6 inch DBH.
  - tree dominants = non-native lollypop tree with leaf deforming pysllid insect infestation, native red willow (multi-trunk)
  - exotic tree sub-dominants = invasive Mexican fan palm, ornamental pear, invasive olive, pistache, invasive black acacia, 1 cypress
  - exotic shrubs/vine = firethorn, hopseed, red trumpet vine
  - native shrub = coyote brush

N. Abel Street to N. Milpitas Blvd., Station 24+00 to 55+50

West Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee predominantly non-native, herbaceous with 22 infrequent landscape trees.
  - Tree aerial cover estimate = 20%.
  - Tree dominants = 30 ft tall pines with 12-14" dbh & invasive holly oak with 4-6" dbh & 12-15 ft height.
  - No shrubs present.
- Outboard levee from N. Able Street to upstream end of triangle park.
  - Composite [tree + shrub] aerial cover = 30-40% [20% trees + 20% shrubs]. Tree DBH range 2-12". Tree height range = 6-12 ft. Shrub height = 6 ft.
  - Tree dominants = non-native ash possibly naturalized from park planting.
  - Other trees present = 2 Mexican fan palms, 1 black acacia, 1 Eucalyptus @ 10" DBH, purple leaf plums, Pyracantha
  - Shrub dominant = Hakea
  - Other shrubs present = oleander

- Outboard levee from upstream end of triangle park to North Milpitas Blvd.
  - Composite [tree + shrub] aerial cover visual estimate = 100% [80% shrubs + 20% trees]. Shrubs 6-12 ft tall. Occasional trees 10-30 ft tall with DBH range 4-18 inches.
  - Tree dominant = African sumac
  - Other trees present = pines, 1 London plane, invasive holly oak, purple leaf plums, Eucalpytus
  - Shrub dominant = Acacia redolens
  - Shrub sub- dominants = Hakea [50% live, 50% dead], lemonade berry
  - Other shrubs/vines present = Jasminum polyanthemum, oleander, firethorn

East Side Structural/Species Composition and Cover Estimates:

- Riparian/ inboard levee from N. Abel Street to N. Milpitas Blvd. predominantly non-native herbaceous with scattered trees.
  - Dominant trees = planted pines 8-10" DBH [live and dead] & 15-20 ft tall and invasive holly oak @ 3-6 inch DBH & 8-12 ft tall.
  - No shrubs present
- Outboard levee from north Abel Street to downstream end of lake (station 34+00) Mix of non-native landscape trees and shrubs.
  - Composite [Tree + Shrub] Aerial Cover visual estimate = 100% [40% trees + 60% shrubs].
  - Dominant trees = exotic Peruvian pepper, exotic pines; 30 ft tall; DBH range 6-14 inches
  - Dominant shrub = exotic Acacia longifolia 10-15 ft tall
  - Shrub sub-dominants = southern California native lemonade berry, invasive Italian buckthorn
- Outboard Levee along lake. Predominantly non-native herbaceous with 3 dead Mexican fan palms @ 14" dbh under power lines.
  - 1 holly oak, shrub form
- Outboard Levee u/s end of lake to N. Milpitas Blvd: mix of older landscape trees and shrubs
  - Composite [Tree + Shrub] Aerial Cover = 100% [75% trees + 25% shrubs]
  - Dominant trees = pines and Peruvian pepper to 30 ft tall; multi-stems; DBH range 8-14 inches
  - Shrub dominant = southern California native lemonade berry; 5-10 ft tall
  - Shrub sub-dominant = Acacia redolens

N. Milpitas Blvd. To N. Hillview Drive, Station 55+50 to 79+50

West Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee from N. Milpitas Blvd to N. Hillview Drive: predominantly exotic herbaceous with scattered individual exotic trees.
  - Tree aerial cover visual estimate = 15-20%.
  - Tree dominants = holly oak to 30 ft tall and 10-12" dbh; multi-trunk pines to 40 ft tall and 12-18 inch dbh, 1 valley oak 10" dbh.
  - No true shrubs present. One holly oak stump sprout @ 10 ft tall.
- Outboard levee [shallow grade] Mix of predominantly non-native landscape shrubs 6-14 feet tall with a few scattered small trees to 15 feet tall.
  - Composite [tree + shrub] aerial cover estimate = 100% [tree 10% + 90% shrub]
  - Trees present = African sumac, pines
  - Dominant shrub = Acacia redolens

    - Sub-dominant shrubs = bottlebrush, cotoneaster, non-local ceanothus [some dead or chlorotic], coyote brush, glossy privet
- Outboard levee [at grade with Mervyn's parking lot landscape]
    - Composite [tree + shrub] aerial cover visual estimate = 40%.
    - Dominant trees = pine and holly oak. Pines to 40 ft tall and 20" dbh.
    - Psyllid-infested lollypop trees from Mervyn's landscape hanging over a few feet inside project ROW could be trimmed back.

East Side Structural/Species Composition and Cover Estimates:
Both inboard and outboard levees, primarily dry, mowed non-native herbaceous with scattered isolated landscape trees & shrubs. Outboard landscaping concentrated near trail entries at Santa Rita Drive and N. Hillview.

- Composite [tree + shrub] aerial cover visual estimate = 20-25%
- Tree Aerial Cover visual estimate = 20%; DBH range 6-18"
- Tree dominants = planted pine 25-40 ft tall
- Tree sub-dominants = holly oak 4-6" dbh and 8-15 ft tall; plus a few psyllid-infected lollypop trees
- Shrub Cover Estimate = 5% only on outboard; average 10 ft. tall; dominants = elderberry & coyote brush

N. Hillview Drive to Calaveras Blvd., Station 79+50 to 86 + 00

West Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee is old landscaping.
    - Composite [tree + shrub] aerial cover visual estimate = 60% [10% shrub + 50% tree]
    - Tree dominants = holly oak to 20-25 ft tall with 5-10" dbh
    - Shrub dominants = planted toyons and invasive glossy privet 10-20 ft tall
    - Other shrubs present = coyote brush, elderberry, dying Italian buckthorn

East Side Structural/Species Composition and Cover Estimates:

- Riparian/inboard levee is old landscaping.
    - Composite [tree + shrub] aerial cover visual estimate = 80% [30% shrub + 50% tree]. Tree dbh range = 4-20 inches. Tree height range = 15-40 ft
    - Tree dominant = planted pine
    - Other trees present = holly oak, Mexican fan palm, non-native ash, London plane, eastern redbud, olive
    - Shrub dominants = lollypop trees in shrub form
    - Other shrubs present = coyote brush, Italian buckthorn, toyon
- Outboard levee does not exist.

Nomenclature[21] for Trees

African sumac = *Rhus lancea*
ash = *Fraxinus uhdei*
black acacia = *Acacia melanoxylon*
cypress = *Cupressus sp.*
eucalyptus = *Eucalyptus sp.*

[21] From The Jepson Manual: *Higher Plants of California*. University of California Press. 1993.

Nomenclature for Trees *(Continued)*
holly oak = *Quercus ilex*
lollypop tree = *Myoporum laetum*
London plane = *platanus X acerifolia*
Mexican fan palm = *Washingtonia robusta*
olive = *Olea europaea*
ornamental pear = *Pyrus calleryana or Pyrus kawakamii*
Peruvian pepper = *Schinus molle*
pine = *Pinus spp.*
pistache = *Pistacia chinensis*
purple leaf plum = *Prunus cerasifera*
red willow = *Salix laevigata*

Nomenclature for Shrubs
acacia shrubs = *Acacia redolens;* and, *A. longifolia*
bottlebrush = *Callistemon sp.*
ceanothus = *Ceanothus sp.*
cotoneaster = *Cotoneaster lacteus*
coyote brush = *Baccharis pilularis*
elderberry = *Sambucus mexicana*
firethorn = *Pyracantha sp.*
glossy privet = *Ligustrum lucidum*
hopseed = *Dodonaea viscose*
Italian buckthorn = *Rhamnus alaternus*
jasmine = *Jasminum polyanthemum*
lemonade berry = *Rhus integrifolia*
oleander = *Nerium oleander*
red trumpet vine = *Distictis buccinatoria*
sweet hakea = *Hakea suaveolens*

EXHIBIT B

Annotated Aerial Photographs and Table Showing Impacted Upland Vegetation

Mark Red + Shrubs

USERNAME: jennford Wed 18 Jan 2012 06:00am
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NOTE:

1. AERIAL PHOTOGRAPHY WAS TAKEN 2006.

PLAN
SCALE 1" = 50'

1

USERNAME: jennford Wed 18 Jan 2012 08:01am
FILENAME: K:\Active Projects\MP-4017400\Lower Berryessa Creek Project\Sheet\Misc\To Engineer\2011-10-06\trees_100511

Merge Trees + Shrubs

Fence potential

Fencing appears on earthpass support soil

MATCH LINE

NOTE:

1. AERIAL PHOTOGRAPHY WAS TAKEN 2006.

PLAN
SCALE 1" = 50'

2

USERNAME: jennford Wed 18 Jan 2012 - 08:03am
FILENAME: K:\Active Projects\JP-4017400A\Lower Berryessa Creek Project\Sheet\Misc\To Engineer\2011-10-06\trees_100611

Merge Trees + Shrubs

Merge Trees + Shrubs

Merge Trees + Shrubs

1. AERIAL PHOTOGRAPHY WAS TAKEN 2006.

PLAN
SCALE 1" = 50'

3

USERNAME: jenford Wed 18 Jan 2012 08:04am
FILENAME: K:\Active Projects\MP-40174004\Lower Berryessa Creek Project\Sheet\Misc\To Engineer\2011-10-06\trees_100611

Merge Trees + Shrubs

Merge Trees + Shrubs

B Tree

MATCH LINE

MATCH LINE

1. AERIAL PHOTOGRAPHY WAS TAKEN 2006.

PLAN
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4

USERNAME: jennford Wed 18 Jan 2012 08:06am
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1. AERIAL PHOTOGRAPHY WAS TAKEN 2006.

PLAN
SCALE 1" = 50'

6

Lower Berryessa Creek Project

Total Aerial Cover - Riparian Habitat (Inboard + Outboard)

Note:
- Dotted tree(s)
- Non-dotted tree(s)

Sheet No	STA	STA	Square Footage (SF)				ACRE (AC)
			Left Bank		Right Bank		
			Inboard	Outboard	Inboard	Outboard	
1	0+00	2+00		5,600			0.1286
1	5+90				1,225		0.0281
1	7+50				400		0.0092
2	24+00					2,250	0.0517
2	26+65	31+70		12,200			0.2801
2	30+00	30+50	2,550				0.0585
2	30+60				100		0.0023
3	31+75	33+70		3,900			0.0895
3	32+00			1,000			0.0230
3	34+80			100			0.0023
3	35+00			75			0.0017
3	35+20			75			0.0017
3	37+00		700				0.0161
3	37+15			100			0.0023
3	38+30		100				0.0023
3	40+90		150				0.0034
3	42+50		1,375				0.0316
3	43+50		100				0.0023
3	45+40		100				0.0023
3	44+70	47+15		4,900			0.1125
3	32+70				600		0.0138
3	33+55				100		0.0023
3	35+35				100		0.0023
3	36+70				200		0.0046
3	37+65				100		0.0023
3	38+25				100		0.0023
3	38+60					150	0.0034
3	39+00					100	0.0023
3	40+00					2,550	0.0585
3	41+30				225		0.0052
3	42+10					400	0.0092
3	42+40				100		0.0023
3	42+85				750		0.0172
3	42+45					250	0.0057
3	42+85					600	0.0138
3	43+50					250	0.0057
3	44+00	45+65				3,600	0.0826
3	46+10	47+15				2,100	0.0482
4	47+15	55+00		19,625			0.4505
4	55+00		600				0.0138
4	56+50			1,500			0.0344
4	56+70		2,700				0.0620
4	58+30			375			0.0086

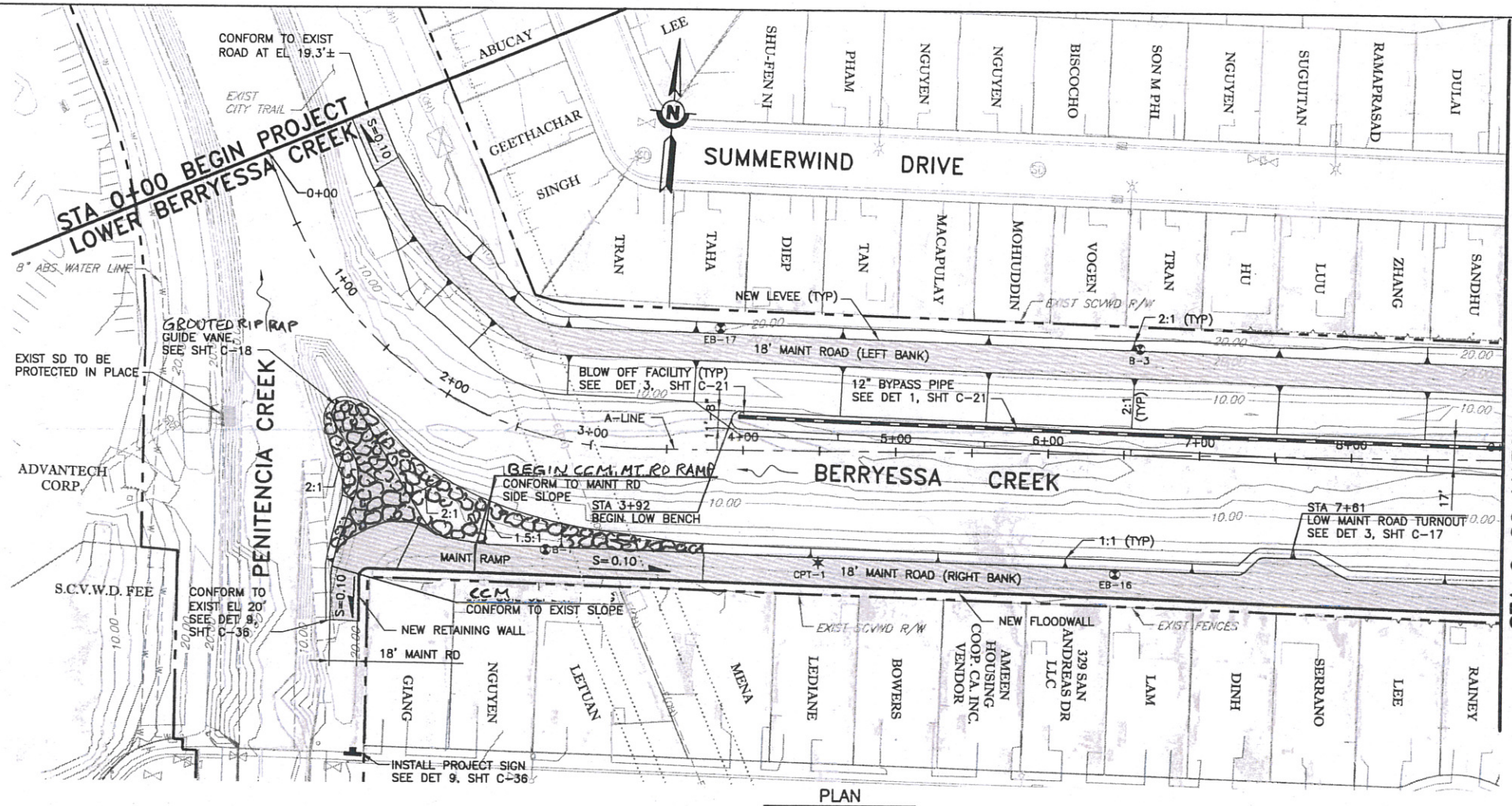
Sheet No	STA	STA	Square Footage (SF)				ACRE (AC)
			Left Bank		Right Bank		
			Inboard	Outboard	Inboard	Outboard	
4	58+40		600				0.0138
4	59+70		350				0.0080
4	60+25		225				0.0052
4	61+50		1,625				0.0373
4	47+15	55+70				21,375	0.4907
4	47+50				150		0.0034
4	48+15				150		0.0034
4	49+15				150		0.0034
4	49+55				100		0.0023
4	49+75				100		0.0023
4	50+20				300		0.0069
4	50+50				225		0.0052
4	51+00				225		0.0052
4	51+60				300		0.0069
4	52+60				1,200		0.0275
4	55+50				875		0.0201
4	57+00					400	0.0092
4	57+30					225	0.0052
4	58+00					150	0.0034
4	58+80				625		0.0143
4	59+70				625		0.0143
4	58+80					225	0.0052
4	59+30					450	0.0103
4	60+70					225	0.0052
4	61+25					450	0.0103
5	63+00		300				0.0069
5	65+50		2,250				0.0517
5	67+40		375				0.0086
5	68+00		1,500				0.0344
5	69+00		3,600				0.0826
5	70+00		4,800				0.1102
5	71+20		400				0.0092
5	71+70		400				0.0092
5	72+30		400				0.0092
5	72+60		300				0.0069
5	72+00			1,500			0.0344
5	76+00		600				0.0138
5	62+50				100		0.0023
5	64+60					100	0.0023
5	65+00					100	0.0023
5	65+40					100	0.0023
5	66+00				1,200		0.0275
5	66+65				400		0.0092
5	67+00					100	0.0023
5	67+70					1,625	0.0373
5	68+50					1,200	0.0275

Sheet No	STA	STA	Square Footage (SF)				ACRE (AC)
			Left Bank		Right Bank		
			Inboard	Outboard	Inboard	Outboard	
5	70+50					2,800	0.0643
5	73+40					500	0.0115
5	74+50					1,500	0.0344
5	67+50				1,000		0.0230
5	68+30				500		0.0115
5	68+80				500		0.0115
5	71+00				3,850		0.0884
5	72+40				1,575		0.0362
5	74+00				1,750		0.0402
5	75+70				300		0.0069
6	77+00		2,850				0.0654
6	79+30			200			0.0046
6	80+40		225				0.0052
6	80+50	85+70		16,800			0.3857
6	77+00				100		0.0023
6	79+40				1,200		0.0275
6	79+80					100	0.0023
6	78+00					8,700	0.1997
6	80+50	85+50				12,900	0.2961
6	85+50				1,800		0.0413
Column Totals (Inboard side*)			0.6698		0.5349		1.2047
Column Totals (Outboard side)				1.5599		1.5031	3.0630
Total Aerial Cover							**4.2676**

Note: Inboard side riparian vegetation included in totals for CDFW habitat

EXHIBIT C

Proposed Low Bench Locations for Riparian Plantings



PLAN

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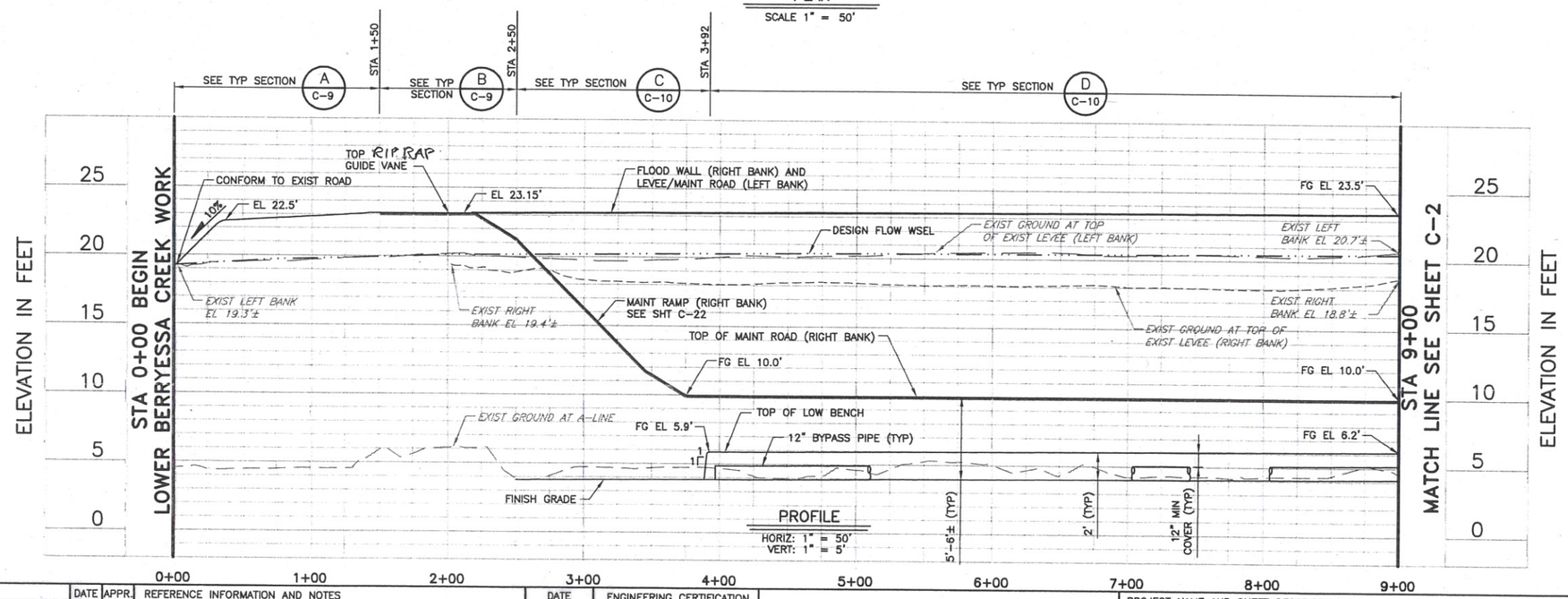

PROFILE

HORIZ: 1" = 50'
VERT: 1" = 5'

REV	DESCRIPTION	DATE	APPR.
	100% PRELIMINARY 01-09-14		

REFERENCE INFORMATION AND NOTES

1. AERIAL PHOTOGRAPHY WAS TAKEN JULY 2008.
2. LEFT AND RIGHT BANKS ARE VIEWED LOOKING UPSTREAM.

DATE	JAN 2014
DESIGN	B. TAN
DRAWN	J. FORD
CHECKED	T. IBARRA

ENGINEERING CERTIFICATION

REGISTERED PROFESSIONAL ENGINEER — ED J. IBARRA — No. 52387 — Exp. 12/31/12 — CIVIL — STATE OF CALIFORNIA

PROJECT ENGINEER DATE

Santa Clara Valley Water District

PROJECT NAME AND SHEET DESCRIPTION:

LOWER BERRYESSA CREEK PROJECT

PLAN AND PROFILE STA 0+00 TO STA 9+00 (A-LINE)

SCALE	PROJECT NUMBER
AS SHOWN	40174004
VERIFY SCALES	SHEET CODE:
0 1" BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST	C-1
	SHEET NUMBER:

USERNAME: JENNFORD Wed 12 Dec 2012 01:16pm
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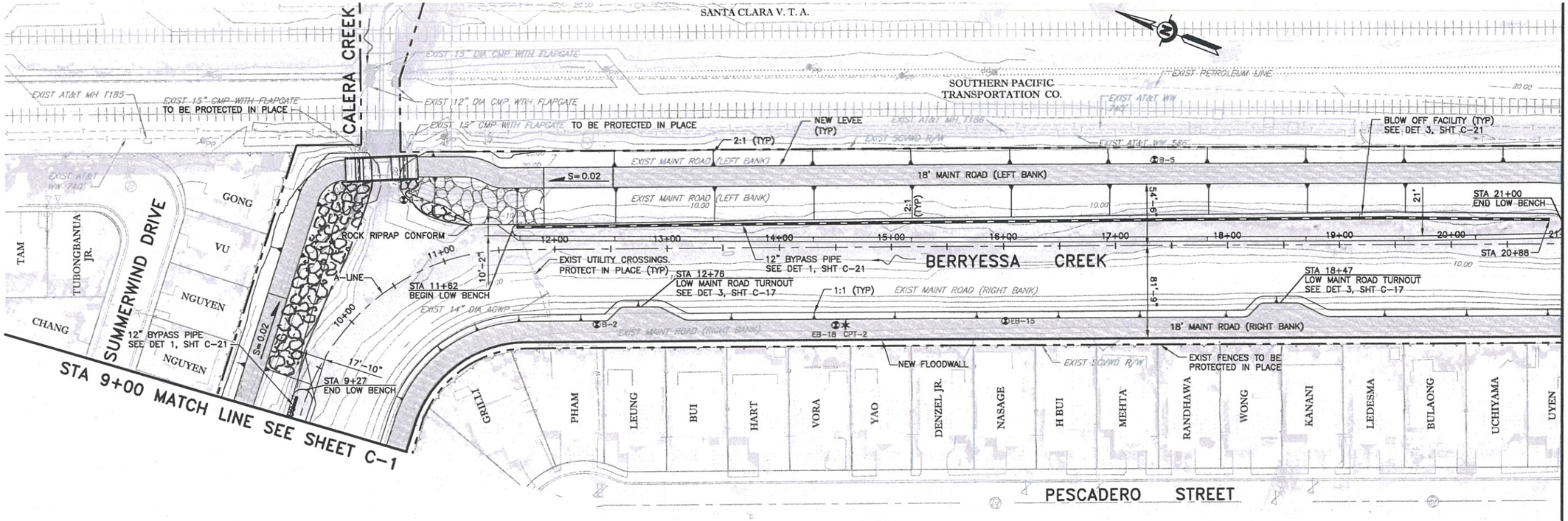

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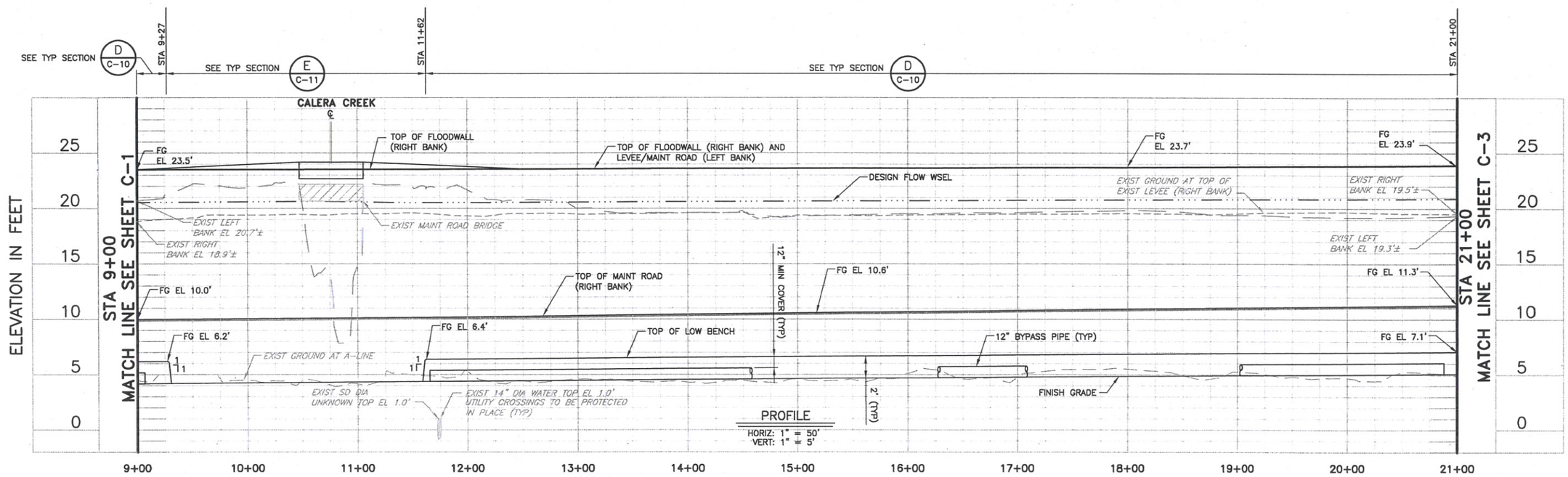


PROFILE
HORIZ: 1" = 50'
VERT: 1" = 5'

REV	DESCRIPTION	DATE	APPR.
	100% PRELIMINARY 01-09-14		

REFERENCE INFORMATION AND NOTES
1. AERIAL PHOTOGRAPHY WAS TAKEN JULY 2008.
2. LEFT AND RIGHT BANKS ARE VIEWED LOOKING UPSTREAM.

DATE JAN 2014
DESIGN B. TAN
DRAWN J. FORD
CHECKED T. IBARRA

ENGINEERING CERTIFICATION
REGISTERED PROFESSIONAL ENGINEER TED J. IBARRA No. 52387 Exp. 12/31/12 CIVIL STATE OF CALIFORNIA
PROJECT ENGINEER DATE

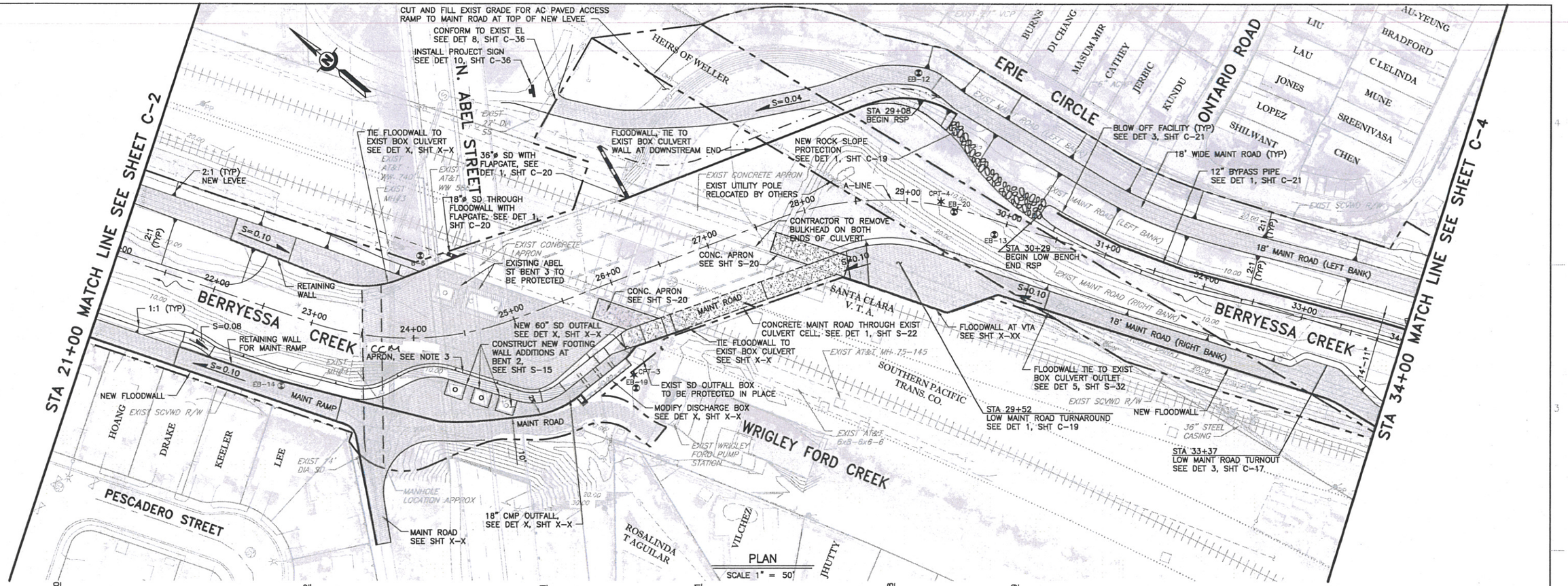
Santa Clara Valley Water District

PROJECT NAME AND SHEET DESCRIPTION:
LOWER BERRYESSA CREEK PROJECT
PLAN AND PROFILE
STA 9+00 TO STA 21+00 (A-LINE)

SCALE: AS SHOWN
VERIFY SCALES 0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

PROJECT NUMBER: 40174004
SHEET CODE: C-2
SHEET NUMBER: 26 OF XX

DOCUMENT NUMBER: BER_CY-C-4017-XXXXX
USERNAME: jennford Mon 29 Jul 2013 10:33am
FILENAME: K:\Active Projects\MP-40174004\Lower Berryessa Creek Project\Sheet\C-02



REV	DESCRIPTION	DATE	APPR.
	100% PRELIMINARY 01-09-14		

REFERENCE INFORMATION AND NOTES

1. AERIAL PHOTOGRAPHY WAS TAKEN JULY 2008.
2. LEFT AND RIGHT BANKS ARE VIEWED LOOKING UPSTREAM.
3. SEE PLAN ON SHEET S-21 FOR CCM APRON DETAIL.
4. SEE SHEET C-23 FOR PLAN DETAIL FROM STA 21+00 TO STA 25+00.
5. SEE SHEET C-27 FOR PLAN DETAIL FROM STA 25+00 TO STA 31+00.

DATE	
JAN 2014	
DESIGN	B. TAN
DRAWN	J. FORD
CHECKED	T. IBARRA

ENGINEERING CERTIFICATION

REGISTERED PROFESSIONAL ENGINEER TED J. IBARRA No. 52387 Exp. 12/31/12 CIVIL STATE OF CALIFORNIA

PROJECT ENGINEER DATE

Santa Clara Valley Water District

PROJECT NAME AND SHEET DESCRIPTION:

LOWER BERRYESSA CREEK PROJECT

PLAN AND PROFILE
STA 21+00 TO STA 34+00 (A-LINE)

SCALE: AS SHOWN

VERIFY SCALES: 0 — 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

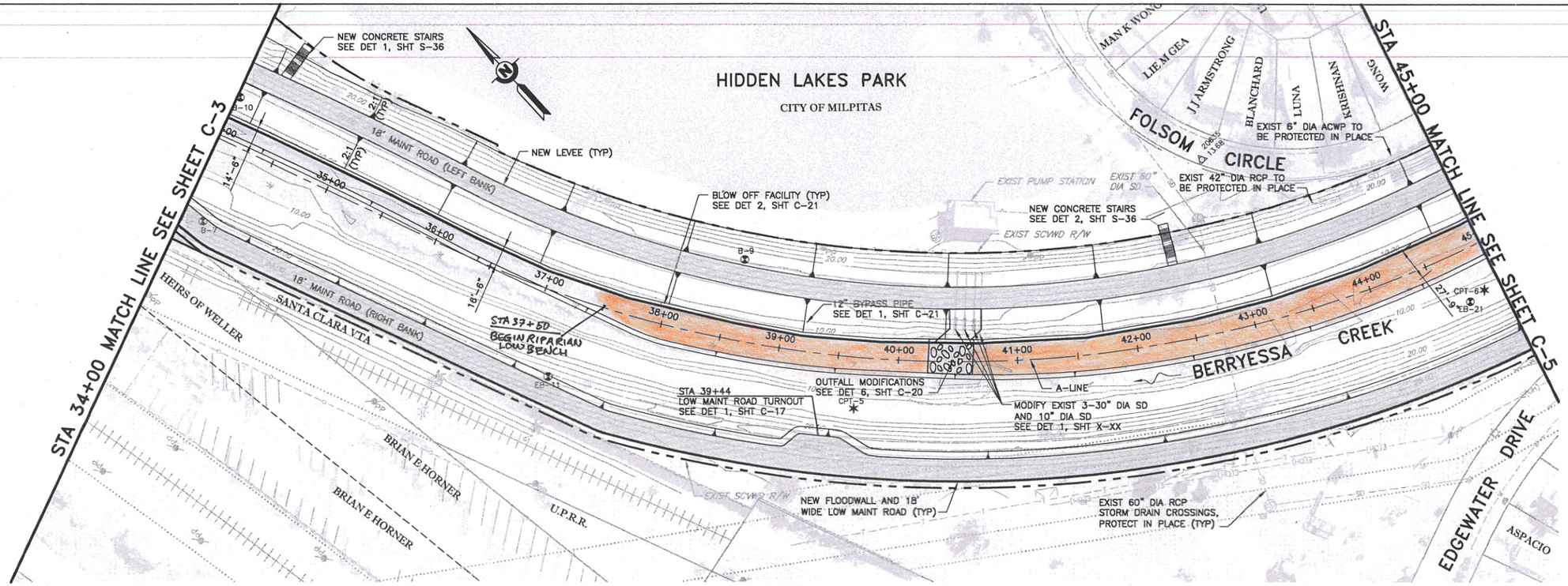
PROJECT NUMBER: 40174004

SHEET CODE: C-3

SHEET NUMBER: 27 OF XX

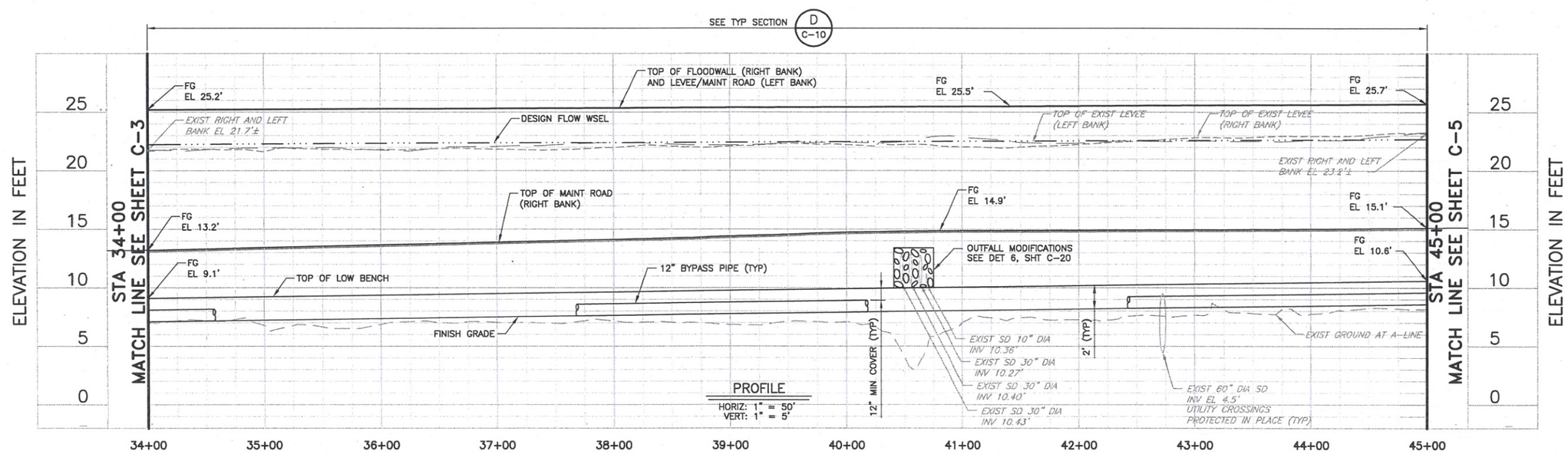
DOCUMENT NUMBER: BER_CY-C-4017-XXXXX

USERNAME: jenford Wed 21 Aug 2013 04:33pm
FILENAME: K:\Active Projects\WP-40174004\Lower Berryessa Creek Project\Sheet\C-03



PLAN

SCALE 1" = 50'



PROFILE

HORIZ: 1" = 50'
VERT: 1" = 5'

REV	DESCRIPTION	DATE	APPR.
	100% PRELIMINARY 01-09-14		

REFERENCE INFORMATION AND NOTES

1. AERIAL PHOTOGRAPHY WAS TAKEN JULY 2008.
2. LEFT AND RIGHT BANKS ARE VIEWED LOOKING UPSTREAM.

DATE	JAN 2014
DESIGN	B. TAN
DRAWN	J. FORD
CHECKED	T. IBARRA

ENGINEERING CERTIFICATION

REGISTERED PROFESSIONAL ENGINEER TED J. IBARRA No. 52387 Exp. 12/31/12 CIVIL STATE OF CALIFORNIA

PROJECT ENGINEER DATE

Santa Clara Valley Water District

PROJECT NAME AND SHEET DESCRIPTION:

LOWER BERRYESSA CREEK PROJECT

PLAN AND PROFILE
STA 34+00 TO STA 45+00 (A-LINE)

SCALE: AS SHOWN

VERIFY SCALES 0 1"

BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

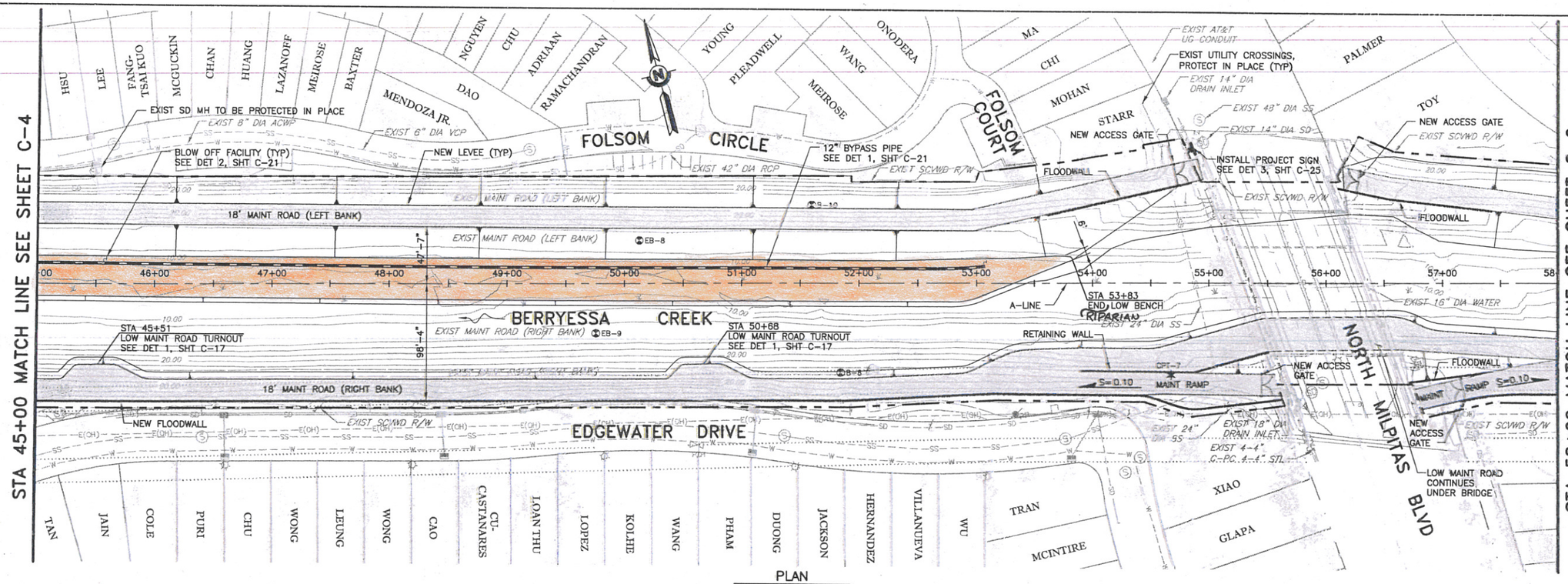
PROJECT NUMBER: 40174004

SHEET CODE: C-4

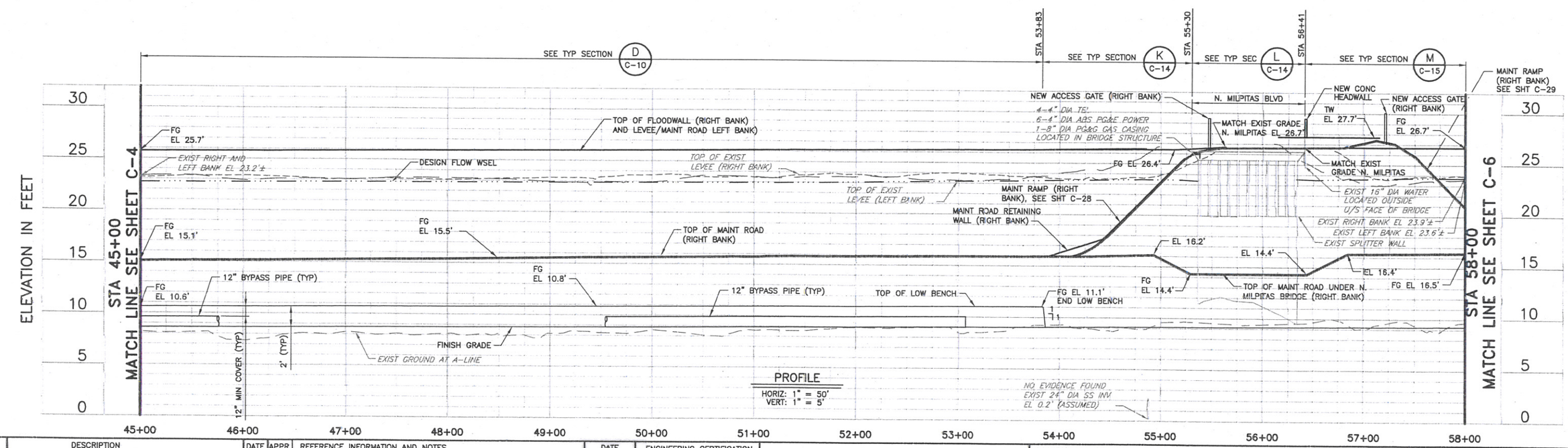
SHEET NUMBER: 28 OF XX

DOCUMENT NUMBER: BER_CY-C-4017-XXXXX

USERNAME: jennford Mon 29 Jul 2013 10:35am
FILENAME: K:\Active Projects\MP-40174004\Lower Berryessa Creek Project\Sheet\C-04



PLAN
SCALE 1" = 50'



PROFILE
HORIZ: 1" = 50'
VERT: 1" = 5'

REV	DESCRIPTION	DATE	APPR.
	100% PRELIMINARY 01-09-14		

REFERENCE INFORMATION AND NOTES

1. AERIAL PHOTOGRAPHY WAS TAKEN JULY 2008.
2. LEFT AND RIGHT BANKS ARE VIEWED LOOKING UPSTREAM.

DATE	JAN 2014
DESIGN	B. TAN
DRAWN	J. FORD
CHECKED	T. IBARRA

ENGINEERING CERTIFICATION

REGISTERED PROFESSIONAL ENGINEER — TED J. IBARRA — No. 52387 — Exp. 12/31/12 — CIVIL — STATE OF CALIFORNIA

PROJECT ENGINEER DATE

Santa Clara Valley Water District

PROJECT NAME AND SHEET DESCRIPTION:

LOWER BERRYESSA CREEK PROJECT

PLAN AND PROFILE
STA 45+00 TO STA 58+00 (A-LINE)

SCALE	PROJECT NUMBER
AS SHOWN	40174004

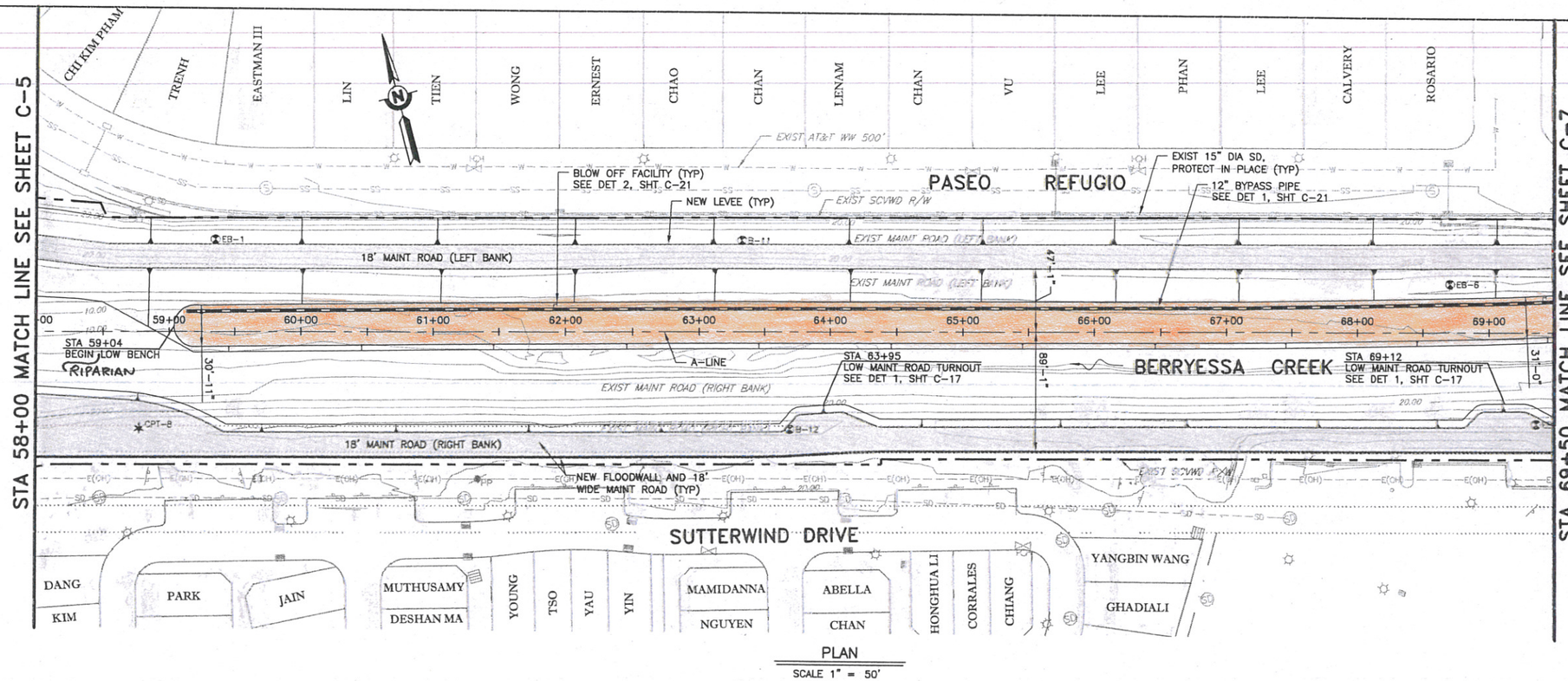
VERIFY SCALES
0 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

SHEET CODE: C-5

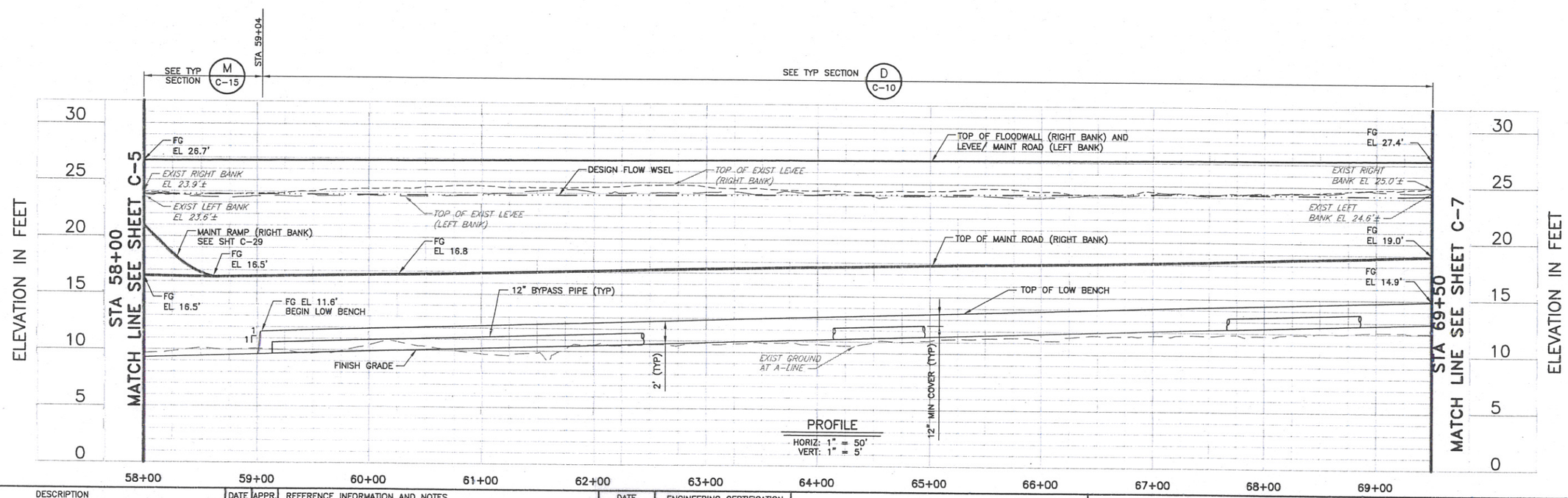
SHEET NUMBER: 29 OF XX

DOCUMENT NUMBER: BER_CY-C-4017-XXXXX

USERNAME: JENNFORD Wed 12 Dec 2012 03:54pm
FILENAME: K:\Active Projects\MP-40174004\Lower Berryessa Creek Project\Sheet\C-05



PLAN
SCALE 1" = 50'



PROFILE
HORIZ: 1" = 50'
VERT: 1" = 5'

REV	DESCRIPTION	DATE	APPR.
	100% PRELIMINARY 01-09-14		

REFERENCE INFORMATION AND NOTES
1. AERIAL PHOTOGRAPHY WAS TAKEN JULY 2008.
2. LEFT AND RIGHT BANKS ARE VIEWED LOOKING UPSTREAM.

DATE	JAN 2014
DESIGN	B. TAN
DRAWN	J. FORD
CHECKED	T. IBARRA

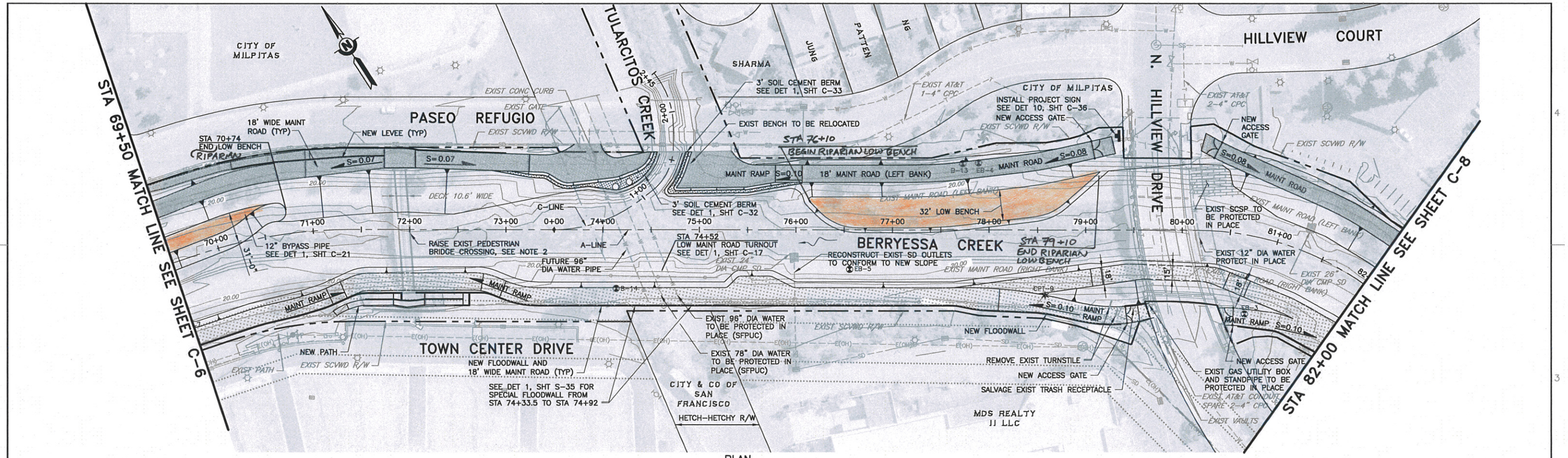
ENGINEERING CERTIFICATION
REGISTERED PROFESSIONAL ENGINEER TED J. IBARRA No. 52387 Exp. 12/31/12 CIVIL STATE OF CALIFORNIA
PROJECT ENGINEER DATE

Santa Clara Valley Water District

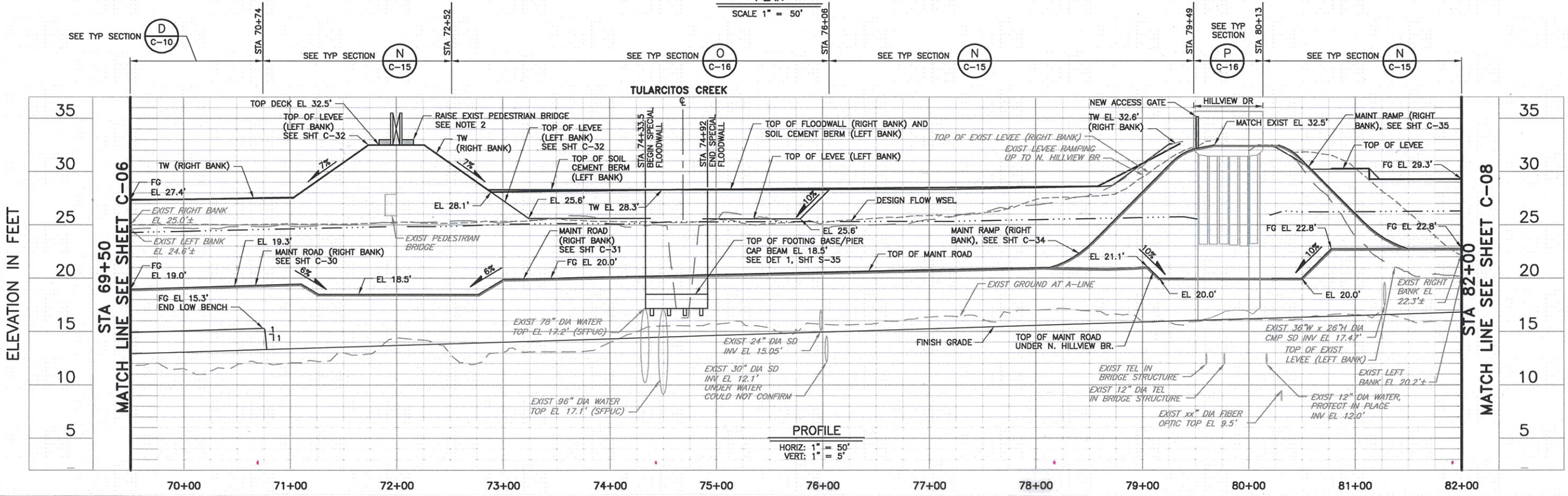
PROJECT NAME AND SHEET DESCRIPTION:
LOWER BERRYESSA CREEK PROJECT
PLAN AND PROFILE
STA 58+00 TO STA 69+50 (A-LINE)

SCALE	PROJECT NUMBER
AS SHOWN	40174004
VERIFY SCALES 0 1" BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	SHEET CODE: C-6
	SHEET NUMBER: 30 OF XX

DOCUMENT NUMBER: BER_CY-C-4017-XXXXX
USERNAME: JENNFORD Wed 12 Dec 2012 04:10pm
FILENAME: K:\Active Projects\MP-40174004\Lower Berryessa Creek Project\Sheet\C-06



PLAN
SCALE 1" = 50'



PROFILE
HORIZ: 1" = 50'
VERT: 1" = 5'

REV	DESCRIPTION	DATE	APPR.
	100% PRELIMINARY 01-09-14		

REFERENCE INFORMATION AND NOTES

1. AERIAL PHOTOGRAPHY WAS TAKEN JULY 2008.
2. LEFT AND RIGHT BANKS ARE VIEWED LOOKING UPSTREAM.

DATE	JAN 2014
DESIGN	B. TAN
DRAWN	J. FORD
CHECKED	T. IBARRA

ENGINEERING CERTIFICATION
REGISTERED PROFESSIONAL ENGINEER — TED J. IBARRA — No. 52387 — Exp. 12/31/12 — CIVIL — STATE OF CALIFORNIA
PROJECT ENGINEER DATE

Santa Clara Valley Water District

PROJECT NAME AND SHEET DESCRIPTION:

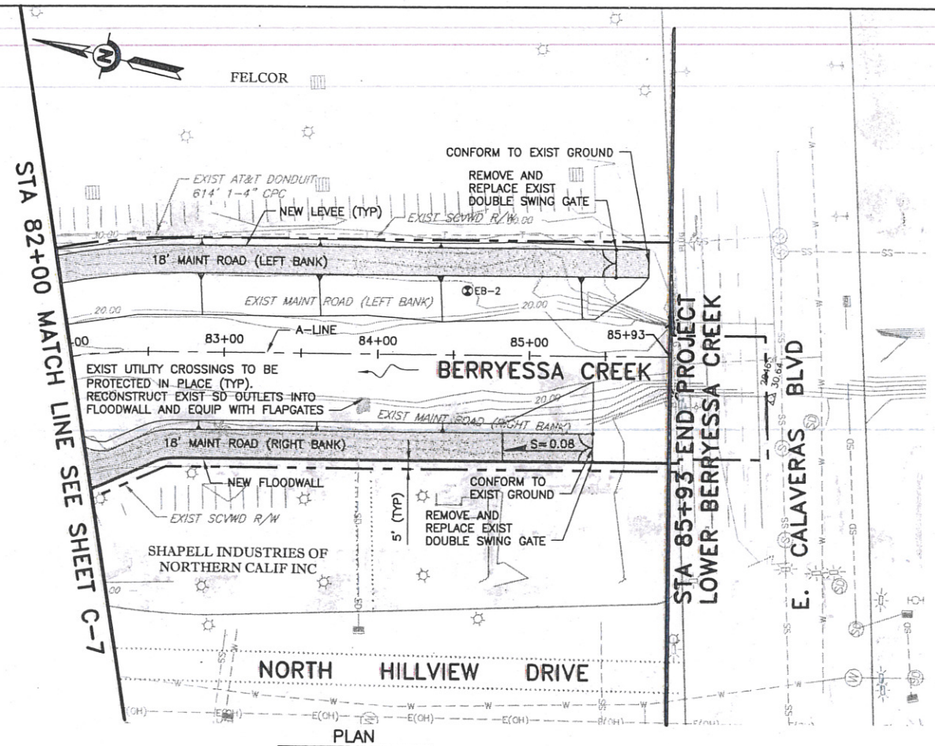
LOWER BERRYESSA CREEK PROJECT

PLAN AND PROFILE
STA 69+50 TO STA 82+00 (A-LINE)

SCALE: AS SHOWN
VERIFY SCALES: 0 — 1"
BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

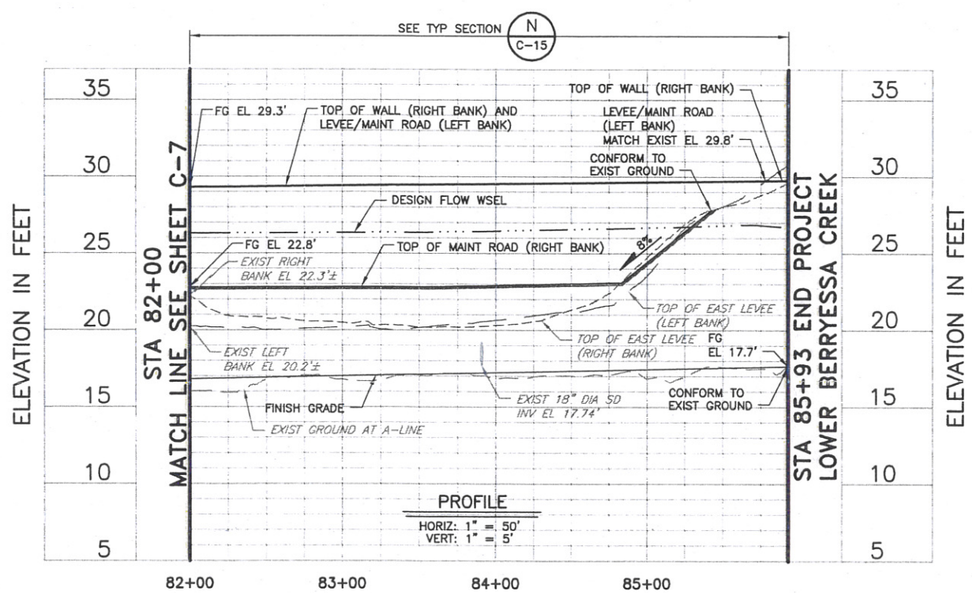
PROJECT NUMBER: 40174004
SHEET CODE: C-7
SHEET NUMBER: 31 OF XX

USERNAME: Jennford 1/9/2014 11:57 AM
FILENAME: K:\Active Projects\MP-40174004\Lower Berryessa Creek Project\Sheet\Figure\Figure 2.dwg



PLAN

SCALE 1" = 50'



PROFILE

HORIZ: 1" = 50'
VERT: 1" = 5'

REV	DESCRIPTION	DATE	APPR.
	100% PRELIMINARY 01-09-14		

REFERENCE INFORMATION AND NOTES

1. AERIAL PHOTOGRAPHY WAS TAKEN JULY 2008.
2. LEFT AND RIGHT BANKS ARE VIEWED LOOKING UPSTREAM.

DATE	JAN 2014
DESIGN	B. TAN
DRAWN	J. FORD
CHECKED	T. IBARRA

ENGINEERING CERTIFICATION

REGISTERED PROFESSIONAL ENGINEER TED J. IBARRA No. 52387 Exp. 12/31/12 CIVIL STATE OF CALIFORNIA

PROJECT ENGINEER DATE

Santa Clara Valley Water District

PROJECT NAME AND SHEET DESCRIPTION:

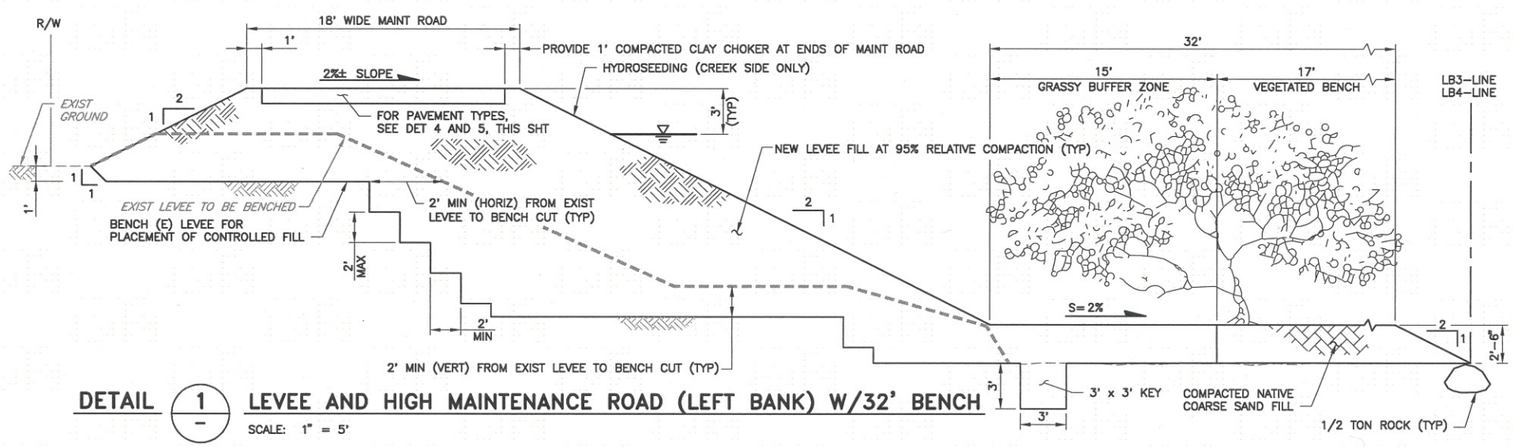
LOWER BERRYESSA CREEK PROJECT

PLAN AND PROFILE
STA 82+00 TO STA 85+93 (A-LINE)

SCALE	PROJECT NUMBER
AS SHOWN	40174004
VERIFY SCALES 0 1" BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	SHEET CODE: C-8
	SHEET NUMBER: 32 OF XX

DOCUMENT NUMBER: BER_CY-C-4017-XXXXX

USERNAME: JENNFORD Wed 12 Dec 2012 04:32pm
FILENAME: K:\Active Projects\MP-4017400A\Lower Berryessa Creek Project\Sheet\C-08



DETAIL 1 — LEVEE AND HIGH MAINTENANCE ROAD (LEFT BANK) W/32' BENCH

SCALE: 1" = 5'

Santa Clara Valley Water District

PROJECT NAME AND SHEET DESCRIPTION:	SCALE	PROJECT NUMBER
LOWER BERRYESSA CREEK PROJECT	AS SHOWN	40174004
	VERIFY SCALES 0 1" BAR IS ONE INCH ON ORIGINAL DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	FIGURE 11
RIPARIAN BENCH DETAIL		1 OF 1

USERNAME: Patrikey 2/5/2014 10:33 AM
FILENAME: K:\Active Projects\WP-40174004\Lower Berryessa Creek Project\Sheet\Figure\Figure 11.dwg